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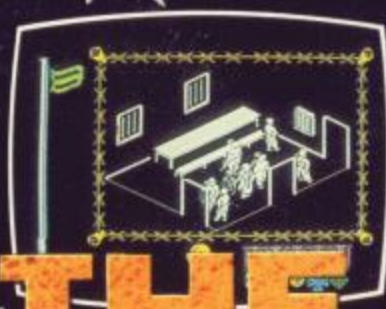
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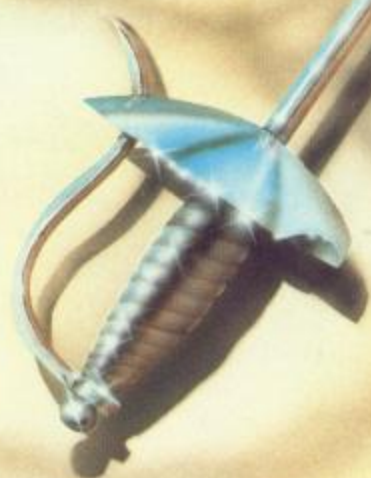
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DATA STATEMENTS

Lighthearted Pleasures

Although this isn't really the time of year for masses of games releases there are still quite a few new titles around for you to choose from.

Sky Runner for the C64 from Cascade Software (£9.95 cassette, £12.95 disk) is a futuristic game which deals with drug wars. The drug is Sky which makes the population completely docile. Your job is to terminate the drug harvesting operation and thus free the populus from their soul destroying existence.

According to the authors the game was inspired by such movies as *Dune* and *Return of the Jedi* and is the culmination of several month's work. It was launched in the new year.

On a completely different historical level, *The Three Musketeers*, a new game from Swedish Software House, Computer Novels. The new game is available for the C64, C128 (with enhanced graphics) and the Amiga. Tape version is priced at £9.95, the 8-bit version on disk at £14.95 and there is even a 32-bit disk version at £24.95. The well known Three Musketeers story is the theme and the setting is 17th century France in turmoil. The game is built up around digitised pictures and contains six original music scores.

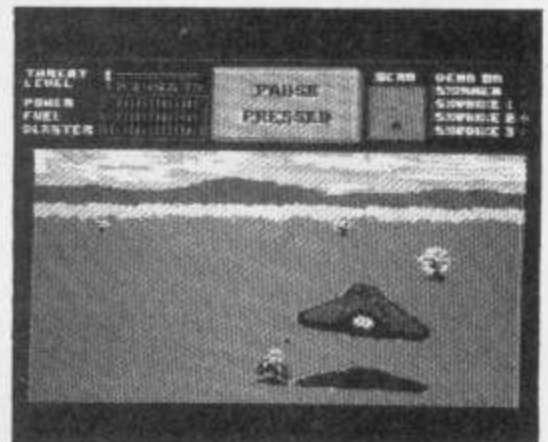
If you think that this all sounds a



bit tame then maybe you'd rather have a go at *Blood 'n Guts* for the C64 (£9.95 tape and £14.95 disk). This is an ancient barabrian dacathlon game which features such imaginative events as ale drinking, human hitting and even cat throwing. Probably not recommended for the faint hearted.

Touchline:

Cascade Games: Harrogate, N Yorks.
Tel: 0423 525325. **American Action and Computer Novels:** Box 10090, S-200 43 Malmo, Sweden. **Tel:** (+46) 40 23 25 20.



Sport Simulations

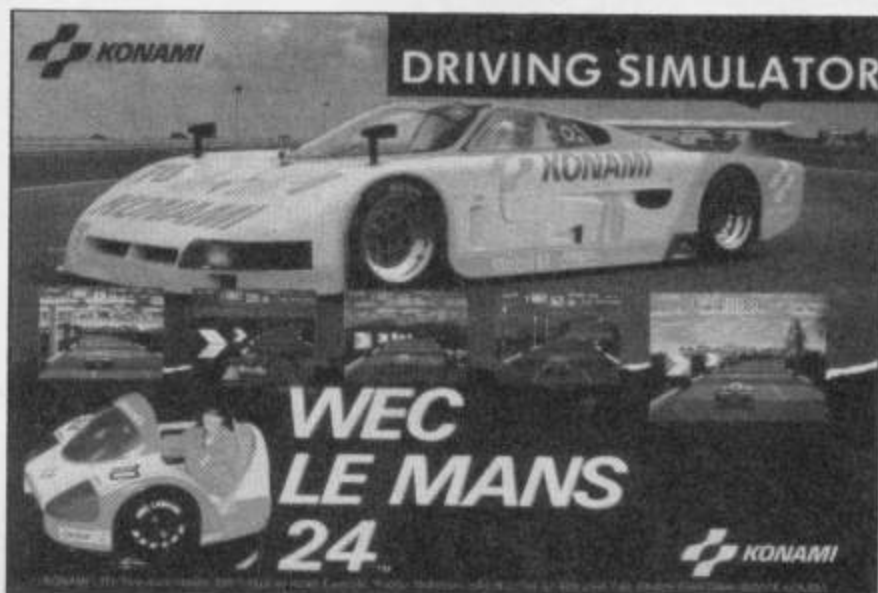
New from US Gold is a 10 pin bowling simulation entitled *10th Frame*. The game is by the authors of *Leaderboard* and aims to recreate the fun on 10 pin bowling for all the family.

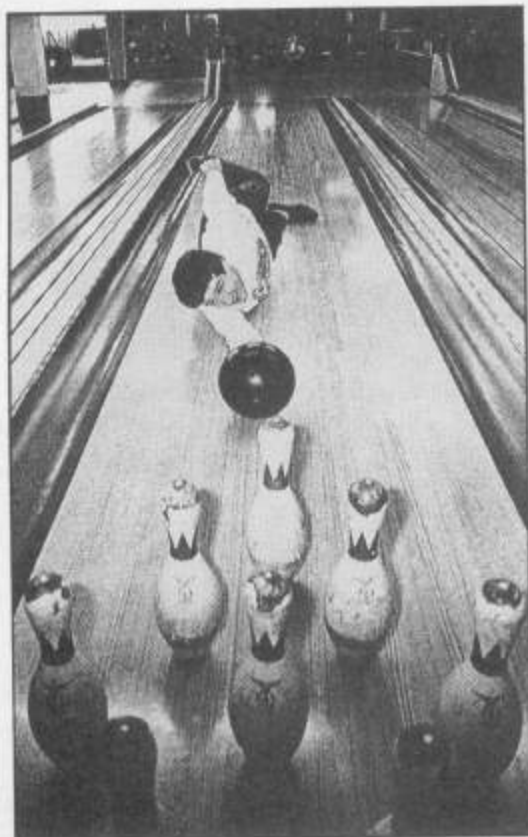
Select league play and you can take the option of playing in teams of up to four people, or open bowling will allow up to eight individual players.

Features include scoreboard printout, automatic scoring, power and hook control, outstanding sound and pin action several different skill levels.

It's available for the C64 and will be released shortly on the Amiga.

On a totally different level,





Cap:

Konami is releasing *WEC Le Mans 24*, a fast racing car simulation. Look out for more details.

Touchline:

US Gold: Units 2/3, Holford Way, Holford, Birmingham B6 7AX. Tel: 021 356 3388. **Konami:** Nemesis, Bank Buildings, Bank Street, Newton Abbot, Devon TQ12 2JL.

Pet Revival

Owners of PET computers have responded enthusiastically to the news that Supersoft is spearheading a revival of this once popular Commodore machine.



Cap:

Supersoft bought up Commodore's last remaining stocks of the PET range in 1986. Since then enquiries from existing users have been flooding in.

However most of the stocks purchased were the older 4032 and 8032 computers and many users who enquired were hoping to expand their systems with the 8296 computers, the last produced in the PET range.

Supersoft has now managed to locate stores of brand new 8296 computers in a Commodore warehouse in Europe. These have now been imported and are available from Supersoft at a price of £595 plus VAT.

Hewson Future

Hot on the heels of the new year, Hewson is releasing a new C64 title. Named *Ranarama*, it's due out at the end of March and is a multi-level game

combining strategy and basic shoot 'em up in order to appeal to all games fans.

The game is set in a labyrinth of rooms viewed from above. Intrigue and suspense is added since the rooms only become visible upon being entered.

You control Mervyn a sorcerer's apprentice who has evaded the evil warlocks by turning himself into a frog whilst trying to concoct a body-building potion. You must combat 12 guarded wizards on each of eight levels to obtain missiles power and shields.

Ranarama was written by Steve Turner, a regular Hewson programs who has written several very popular games including *Dragonatorc*, *Avalon*, *Astro Clone* and more recently, *Quasatron*.

Touchline:

Hewson: 56b Milton Trading Estate, Milton, Abingdon, Oxon OX14 4RX. Tel: 0235 832939.

Welsh Winners

Knoix, the company which produced the *Speed King* Joystick, has been awarded the New Enterprise Award in the Welsh National Business Awards 1986.

The award was presented to the managing director of Konix, Wyn Holloway (left of picture), by Sir John Harvey-Jones the chairman of ICI and was won just over 18 months after the company was formed.

Konix was the only company to reach three finals, the Design Technology Award, the New Enterprise Award and the Business Achievement of the year. Competing companies included Laura Ashley and British Aerospace.

Touchline:

Konix: Unit 13, Sirhowy Hill Industrial Estate, Tredegar, Gwent NP24QZ. Tel: 049525 5913.



Cap:

Care of Your Computer

Accodata has updated and extended its range of cleaning material for computers.

New products include kits for 3½ inch disk drive heads, ¼ inch data cartridge heads, keyboards and casing and printers and typewriters. Kits are designed to clean away dust and grime as well as old ink from ribbons on golfballs and daisy wheels.

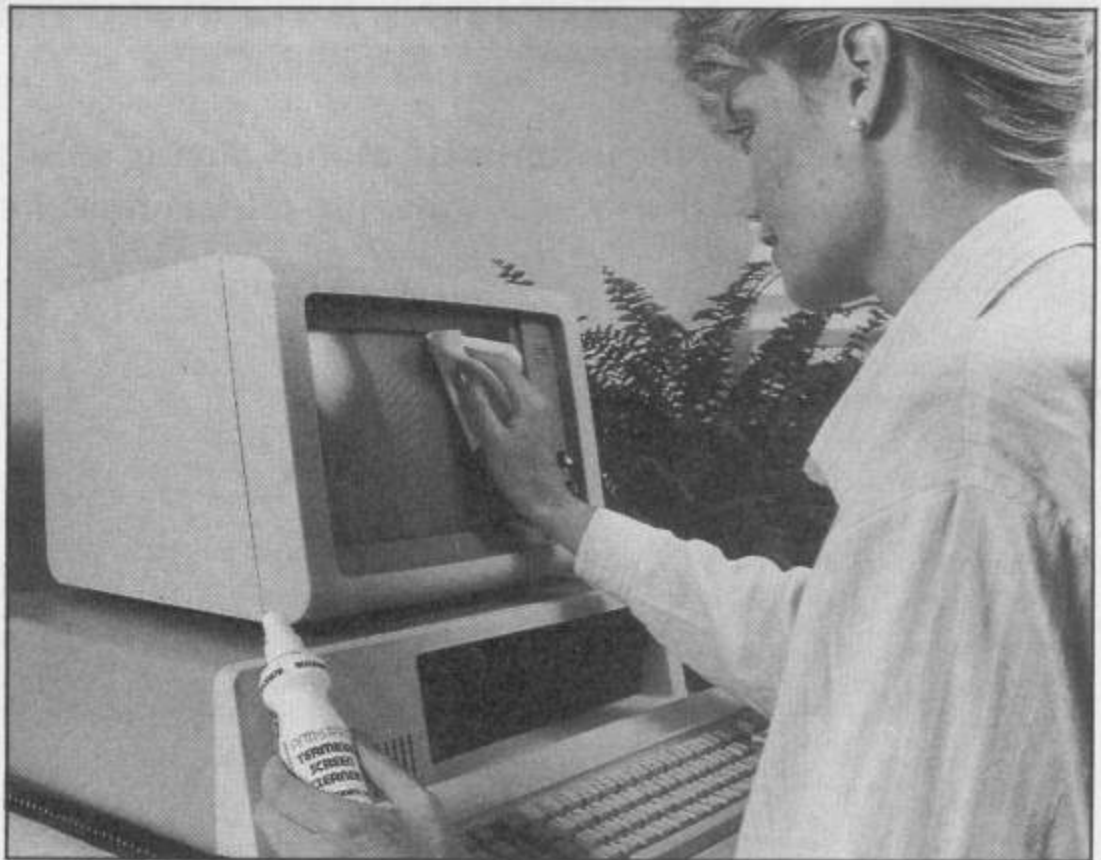
Also from Accodata is a three product range made up of a surge protector, a two way power filter and a four way power filter.

Power line disturbances, known as spikes and surges can damage sensitive equipment, wipe clean a computer's memory and produce garbled data.

Prices are £62.16 for the two way filter, £84 for the four way filter and £12.96 for the surge protector plug.

Touchline:

Accodate: 36 Corydon Road, Beckenham, Kent BR3 4BH. Tel: 01 650 4818.



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Sport on Channel 64

Sport games have been an immensely popular area of software ever since the first crude ping pong. Here's a round up of the best simulations.

By Tony Hetherington

If you're fed up with watching Liverpool playing every weekend. Steve Davis winning another match or yet another contest between Cram, Coe and Ovett then why not tune into Channel 64. We've got over 40 sporting challenges ranging from world football to America's cup racing.

Multiple Events

Activision released *Decathlon* in 1983 which was quickly followed by Ocean's *Daley Thompson's Decathlon*. The race to the Olympics was on. Both featured the 10 gruelling events that form the Olympic Decathlon. *Decathlon* was the more accurate simulation as each competitor frantically waggled his joystick in all 10 events where as Ocean's game demanded success in one event before you could compete in the next.

Now joystick athletes can tackle the sprints and hurdles of *Summer Games* (seven events), high jump, equestrian and canoeing of *Summer Games II* (another seven events), the superb bobsled, ski jump, hot dog ariel, skating and biathlon of *Winter Games* (six excellent events), the round the world tour of logging rolling, barrel jumping, weight lifting and sumo wrestling of *World Games* (eight events) and the budget priced sprinting, archery and diving of *Go for Gold* (seven events). All of these are from US Gold.

Soccer

Football fans had a field day last year with the World Cup in Mexico and we feature five football games. The first was the literally basic conversion of the Spectrum hit *Football Manager* by Addictive Games that has been recently re-released. Unfortunately, C64 owners expected more of a game than their rubber keyed cousins and it failed to score.

The best C64 football game is still Commodore's own *International Soccer*. Its simple gameplay let's you control the action against either human or nine computer oppon-

ents. The system is simple as you control the man that is nearest to the ball with the computer controlling all the "off the ball running".

World Cup Carnival caused the greatest uproar from the crowd when it was released in time to capitalise on the World cup fever. Promising a badge, poster and a game that took six months to develop. However on release the game looked too familiar and turned out to be a slightly revamped version of Artic's *World Cup III*. This earned US Gold a yellow card and boosted sales of *Now Games 2* that also carried Artic's game.

After the World Cup the papers were dominated by the incident when Diego Maradona punched the ball past Peter Shilton to knock England and out of the cup. Now that moment has been immortalised in Grandslam's (Argus) *Peter Shilton's Handball Maradona* game. However, the game itself is dull and uninspiring although it does contain the classic phrase "a game of two halves" in its instructions.

Gremlins new *Footballer of the Year* shows more promise as you battle your way through poverty, low divisions and defences in your struggle to become the best footballer of the year. The game plays a computerised board game with goal attempts coming from bought goal cards and transfers, pools wins and business profits from chance "incident" cards. Despite a few annoying bugs such as league goals being counted twice in your tally the game is ridiculously addictive.

American Football

Football fans who enjoy the game American style can recreate the 1986 Super Bowl when the Bears destroyed the patriots in Ocean's *Super Bowl* as well as play individual games in Bug Bytes budget *American Football*, Ariolasoft's *Touchdown Football* and *The Nexus Super Bowl Sunday*. You can also recreate the entire season in the gridiron version of Addictive's *Football Manager*, *Headcoach*.





My pick of the bunch is *Super Bowl Sunday* that presents some complex accurate statistics in a highly playable form for a selection of football's greatest teams. Now you can be crunched by Chicago's 86 defence, throw touchdown passes with Dan Marino and the 82 Miami Dolphins and watch as John Riggins rips through defences to lead the Redskins to victory.

Baseball

US Football's American brother baseball is also well represented as digital pitchers and hitters can argue over the strikes, balls, base hits and home runs in *Hardball* (US Gold/Accolade), *World Series Baseball* (Imagine) and Activision's *Star League Baseball*.

Accolade's debut game, *Hardball*, is the leader both in graphics and gameplay giving novice and expert a run for their money. Simple joystick moves select from the available sinkers, fastballs, curveballs, sliders and changeups that the hitter must bat over the fence for a home run. Nine innings of non-stop action.

Golf

Golf has never been my favourite sport and has always prompted me to swap channels but Channel 64 has two hardhitting heroes; Ariolasoft's simulation, *Golf Construction Set* and the "hit and see" action of US Gold's (Access) *Leader Board*.

The GCS golfer selects his clubs and then battles against his own handicap on one of four accurately simulated courses represented on screen both as a plan to choose your shot and a 3D view of the action.

There is nothing realistic about the *Leader Board* courses as they consist of a series of islands surrounded by ball chomping lakes. Both games are fun to play and better than the sport they represent. GCS is the more accurate game and suitable for a lengthy campaign to reduce your handicap from beginner (28) down to pro (0). *Leader Board* fans that drove the game to the top of the charts can replay all their best shots as US Gold releases four more courses in its *Leader Board Tournament* expansion set.

There are other golf games such as Mastertronic's budget *Hole in One* and the Argus Nick Faldo *Plays the Open* but *Leader Board* and GCS are the clear leaders.

Cricket

Two famous names battled it out for the cricket honours as Graham Gooch's *Test Cricket* (Audiogenic) took on Tynesoft's *Ian Botham*.

I found Botham's to be the better game once you'd played yourself in but poor graphics let the appalling Gooch cricket take the honours. The graphics are quite impressive but soon lose their appeal as you realise they are just a series

of set patterns that interrupt the action. The game itself is dreadful and can be played in both arcade and simulation modes. The simulation mode is the game you can actually play and win while you're asleep! How well you do in the arcade version depends solely on the skill level. Choose the highest and you'll be all out in two overs but at the lowest you can score fours and sixes off your bat, leg and nose!

And the others

For a change from the "popular" sports why not try wrestling in Melbourne House's *Rock 'N' Wrestle* that features 25 bone crushing moves in another game that out-classes it's sport. The same is also true of Activision's *Two on Two Basketball* that adds excitement to a dreary sport or *Bump, Set and Spike* your way through a volleyball match courtesy of Mastertronic or punch your opponent into a pulp in *Frank Bruno's Boxing* (Elite - now available as part of Hitpack), *Barry McGuigan's World Championship Boxing* (Activision) and US Gold's *Fight Night* in the pick of the pugilists.

Whatever your sport you're sure to find a game to recreate your favourite heroics even yachting (*America's Cup* - US Gold), table tennis (*Superstar Ping Pong* - US Gold) and *Ice Hockey* (from Anco).

Touchline

Activision: 23 Pond Street, London NW3 2PN. Tel: 01 431 1101.

Ocean, Imagine: 6 Central Street, Manchester M2 5NS. Tel: 061 832 6633.

US Gold: Units 2/3, Holford Way, Holford, Birmingham B6 7AX. Tel: 021 356 3388.

Addictive Games: 10 Albert Road, Bournemouth BH1 1BZ. Tel: 0202 296404.

Commodore: Hunters Road, Weldon, Corby, Northants NN17 1QX. Tel: 0536 205555.

Argus: Grandslam, Bug Byte: Victory House, Leicester Place, London WC2H 7NB. Tel: 01 439 0666.

Gremlin: Alpha House, 10 Carver Street, Sheffield S1 4FS. Tel: 0742 753523.

Ariolasoft: 68 Long Acre, London WC2E 9JH. Tel: 01 836 3411.

Nexus: DSB House, 30 High Street, Beckenham, Kent BR3 1AY. Tel: 01 658 5723.

Audiogenic: 39 Suttons Industrial Park, London Road, Reading RG1 6AZ. Tel: 0734 664646.

Tynesoft: Addison Industrial Estate, Blaydon, Tyne & Wear NE21 4TE. Tel: 091 414 4611.

Melbourne House: 60 High Street, Hampton Wick, Kingston-upon-Thames, Surrey KT1 4DB. Tel: 01 943 3911.

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Spelling Checker

An ingenious program to help you provide yourself with a personalised dictionary to avoid those embarrassing mistakes.

By W.I. Sellers

Proof reading a word-processed document is probably not most people's idea of an enjoyable way of spending an hour or so. Thus, any device that can make this job even a little easier is to be welcomed.

A spelling checker helps by comparing every word in the document with a list of common words, and indicating any that it does not find. This is obviously not infallible since the mistyping of a word can produce another word that will be recognized by the spelling checker and so the mistake will not be spotted. Also, it is not possible for the machine to know every word, therefore uncommon words will always be indicated as misspelled.

Normally, this is not the sort of program that can be typed in from a listing in a magazine since the on-line dictionary will contain several thousand words. However, this program is self teaching and can quickly obtain words for its list from documents it is used to check. This is achieved by allowing the user to ask the computer to remember correctly spelled words that it does not yet know. In this way, the computer gets its word list without the user needing to type in any extra words at all.

In Use

The program shown is for use with a disk drive and running it causes a machine code program called 'SPELL-CHECK' to be created. To run the program, type LOAD "SPELL-CHECK",8,1 and then RUN it. The following menu will appear:

- (1) Spelling check
- (2) Options
- (3) Load Dictionary
- (4) Save Dictionary
- (5) Delete Word
- (6) Directory

SPELLING CHECK prompts for a filename and proceeds to perform a spelling check on that file. OPTIONS allows the user to set up spelling check parameters. Thus, the option to add words to the dictionary can be selected; whether or not a printout of the misspelt words is required; and whether the file is Plus/4 built in word processor format or standard ASCII. The LOAD and SAVE DICTIONARY options are for (believe it or not) loading and saving dictionary files. DELETE WORD allows the user to delete an unwanted word from the dictionary - a misspelling that has got in by mistake perhaps. Directory prints out the disk directory.

On first running the spelling

checker, the dictionary is empty and so it is necessary to type '2' to get to the OPTIONS menu. Typing the relevant letter will toggle the parameter: thus pressing 'C' will switch the program to add word mode. Then type 'D' to exit back to the main menu and then press '1' to initiate the spelling checker. This prompts for the name of the file to be checked.

When a word is not found, you are asked whether or not it is to be added to the dictionary. Going through a few lengthy files, getting the computer to add any not too esoteric words to its dictionary will rapidly generate a sizeable list of words that can now be saved as a dictionary file. This can be added each time a file is spelling checked until the limit set by the memory size of the Plus/4 - about 58K bytes or around 7000 words. If these words have been fairly carefully selected, then most words that the checker fails to recognise will indeed be errors.

VC

PROGRAM: CHECKER CREATOR

```

10 OPEN#8,B,8,"SPELLCHECK,P,W"
20 PRINT#8,CHR$(1);CHR$(16);
30 D=4097:L=140
40 T=0
50 FORX=1TO8
60 READA:IFA=-1THEN110
70 PRINT#8,CHR$(A);:D=D+1:T=T+A
80 NEXT
90 READA:IFA=-1THEN110:ELSEIF
I<>ATHENPRINT"ERROR IN LINE "
:L:GOTO120
100 L=L+10:GOTO40
110 IFD<>5858+1THENPRINT"ADDR
ESS ERROR":GOTO120
120 CLOSE#8
130 END
140 DATA11,16,10,0,158,52,49,
48,344
150 DATA57,0,0,0,169,0,141,21,
388
160 DATA255,141,25,255,162,91,
160,16,1105
170 DATA32,105,22,32,228,255,
201,49,924
180 DATA208,6,32,239,19,76,21,
16,617
190 DATA201,50,208,6,32,106,1

```



```

7,76,696
200 DATA1,16,201,51,208,6,32,
,132,667
210 DATA19,76,21,16,201,52,20
8,6,599
220 DATA32,118,18,76,21,16,20
1,53,535
230 DATA208,6,32,246,18,76,21
,16,623
240 DATA201,54,208,199,32,52,
17,76,839
250 DATA21,16,158,147,13,13,1
3,32,413
260 DATA32,32,32,32,32,32,32,
32,256
270 DATA32,77,69,78,85,58,13,
13,425
280 DATA13,32,32,32,32,32,32,
32,237
290 DATA32,32,32,40,49,41,32,
83,341
300 DATA80,69,76,76,73,78,71,
32,555
310 DATA67,72,69,67,75,13,13,
32,408
320 DATA32,32,32,32,32,32,32,
32,256
330 DATA32,40,50,41,32,79,80,
84,438
340 DATA73,79,78,83,13,13,32,
32,403
350 DATA32,32,32,32,32,32,32,
32,256
360 DATA40,51,41,32,76,79,65,
68,452
370 DATA32,68,73,67,84,73,79,
78,554
380 DATA65,82,89,13,13,32,32,
32,358
390 DATA32,32,32,32,32,32,32,
40,264
400 DATA52,41,32,83,65,86,69,
32,460
410 DATA68,73,67,84,73,79,78,
65,587
420 DATA82,89,13,13,32,32,32,
32,325
430 DATA32,32,32,32,32,32,40,
53,285
440 DATA41,32,68,69,76,69,84,
69,508
450 DATA32,87,79,82,68,13,13,
32,406
460 DATA32,32,32,32,32,32,32,
32,256
470 DATA32,40,54,41,32,68,73,
82,422
480 DATA69,67,84,79,82,89,13,
13,496
490 DATA13,32,32,32,32,32,32,
32,237
500 DATA32,32,32,83,69,76,69,
67,460
510 DATA84,32,70,85,78,67,84,
73,573
520 DATA79,78,0,169,147,32,21
0,255,970
530 DATA32,188,200,32,64,17,9
6,162,791
540 DATA79,160,17,32,105,22,3
2,228,675
550 DATA255,201,32,208,249,96
,13,13,1067
560 DATA80,82,69,83,83,32,83,
80,592
570 DATA65,67,69,32,84,79,32,
67,495
580 DATA79,78,84,73,78,85,69,
13,559
590 DATA0,162,208,160,17,32,1
05,22,706
600 DATA162,96,160,22,32,84,1
8,162,736
610 DATA237,160,17,32,105,22,
162,95,830
620 DATA160,22,32,84,18,162,8
,160,646
630 DATA18,32,105,22,162,94,1
60,22,615
640 DATA32,84,18,162,35,160,1
8,32,541
650 DATA105,22,32,228,255,201
,65,208,1116
660 DATA11,173,96,22,73,1,141
,96,613
670 DATA22,76,106,17,201,66,2
08,11,707
680 DATA173,95,22,73,1,141,95
,22,622
690 DATA76,106,17,201,67,208,
11,173,859
700 DATA94,22,73,1,141,94,22,
76,523
710 DATA106,17,201,68,208,204
,96,147,1047
720 DATA13,13,13,32,32,32,32,
32,199
730 DATA32,32,32,32,32,40,65,
41,306
740 DATA32,80,82,73,78,84,69,
82,580
750 DATA32,32,32,0,13,13,32,3
2,186
760 DATA32,32,32,32,32,32,32,
32,256
770 DATA40,66,41,32,65,83,67,
73,467
780 DATA73,32,32,32,32,32,0,1
3,246
790 DATA13,32,32,32,32,32,32,
32,237
800 DATA32,32,32,40,67,41,32,
65,341
810 DATA68,68,32,87,79,82,68,
32,516
820 DATA32,0,13,13,32,32,32,3
2,186
830 DATA32,32,32,32,32,32,40,
68,300
840 DATA41,32,69,88,73,84,13,
13,413
850 DATA13,13,13,32,32,32,32,
32,199
860 DATA32,32,32,32,32,83,69,
76,388
870 DATA69,67,84,32,79,80,84,
73,568
880 DATA79,78,0,134,5,132,6,1
60,594
890 DATA0,177,5,208,8,162,114
,160,834
900 DATA18,32,105,22,96,162,1
10,160,705
910 DATA18,32,105,22,96,79,78
,32,462
920 DATA0,79,70,70,0,162,228,
160,769
930 DATA18,32,105,22,32,94,19
,160,482
940 DATA0,185,224,18,157,51,3
,200,838
950 DATA232,192,4,208,244,138
,162,51,1231
960 DATA160,3,32,189,255,169,
8,170,986
970 DATA168,32,186,255,32,192
,255,32,1152
980 DATA183,255,201,0,208,207
,162,8,1224
990 DATA32,201,255,169,146,13
3,3,169,1108
1000 DATA22,133,4,160,0,120,1
41,63,643
1010 DATA255,177,3,141,62,255
,88,32,1013
1020 DATA210,255,230,3,208,2,
230,4,1142
1030 DATA165,4,205,199,22,208
,230,165,1198
1040 DATA3,205,198,22,208,223
,169,8,1036
1050 DATA32,195,255,32,204,25
5,96,44,1113
1060 DATA83,44,87,147,83,65,8
6,69,664
1070 DATA32,68,73,82,69,67,84
,79,554
1080 DATA82,89,13,13,0,169,1,
141,508
1090 DATA97,22,162,18,160,19,
32,105,615
1100 DATA22,32,101,19,224,0,2
40,237,875
1110 DATA32,161,20,169,0,141,
97,22,642
1120 DATA96,147,87,79,82,68,3
2,63,654
1130 DATA0,238,100,22,172,100
,22,177,831
1140 DATA3,160,0,145,3,230,3,
208,752
1150 DATA2,230,4,165,4,205,19
9,22,831
1160 DATA208,234,165,3,205,19
8,22,208,1243
1170 DATA227,174,99,22,232,23
2,224,54,1264
1180 DATA240,22,189,146,22,56
,237,100,1012
1190 DATA22,157,146,22,232,18
9,146,22,936
1200 DATA233,0,157,146,22,76,
62,19,715
1210 DATA141,62,255,88,96,162
,121,160,1085
1220 DATA19,32,105,22,162,0,3
2,207,579
1230 DATA255,157,51,3,232,201
,13,208,1120
1240 DATA245,202,169,13,32,21
0,255,96,1222
1250 DATA70,73,76,69,78,65,77
,69,577

```


1260 DATA32,63,0,162,192,160,
19,32,660
1270 DATA105,22,32,210,19,162
,8,32,590
1280 DATA198,255,169,146,133,
3,169,22,1095
1290 DATA133,4,160,0,32,130,2
0,192,671
1300 DATA0,208,19,120,141,63,
255,145,951
1310 DATA3,141,62,255,88,230,
3,208,990
1320 DATA2,230,4,76,157,19,16
9,8,665
1330 DATA32,195,255,32,204,25
5,96,147,1216
1340 DATA76,79,65,68,32,68,73
,82,543
1350 DATA69,67,84,79,82,89,13
,13,496
1360 DATA0,32,94,19,138,162,5
1,160,656
1370 DATA3,32,189,255,169,8,1
70,168,994
1380 DATA32,186,255,32,192,25
5,32,183,1167
1390 DATA255,201,0,208,228,96
,162,107,1257
1400 DATA160,20,32,105,22,32,
210,19,600
1410 DATA169,147,32,210,255,1
62,8,32,1015
1420 DATA198,255,173,95,22,20
8,19,162,1132
1430 DATA0,160,0,32,207,255,2
32,208,1094
1440 DATA1,200,192,1,208,245,
224,47,1118
1450 DATA208,241,162,0,32,225
,255,240,1363
1460 DATA64,32,130,20,192,0,2
08,57,703
1470 DATA32,140,20,201,65,144
,15,201,818
1480 DATA91,176,11,157,51,3,2
32,224,945
1490 DATA64,240,10,76,29,20,2
24,0,663
1500 DATA240,3,32,161,20,32,2
25,255,968
1510 DATA240,23,32,130,20,192
,0,208,845
1520 DATA16,32,140,20,201,65,
144,237,855
1530 DATA201,91,176,233,162,0
,76,52,991
1540 DATA20,169,8,32,195,255,
32,204,915
1550 DATA255,96,147,82,69,65,
68,32,814
1560 DATA84,69,88,84,13,13,0,
170,521
1570 DATA160,255,32,186,255,3
2,192,255,1367
1580 DATA96,32,207,255,72,32,
183,255,1132
1590 DATA168,104,96,172,95,22
,208,8,873
1600 DATA201,32,176,3,24,105,
64,96,701
1610 DATA201,192,144,251,56,2

33,128,96,1301
1620 DATA120,141,63,255,142,1
00,22,162,1005
1630 DATA0,189,51,3,56,233,65
,10,607
1640 DATA141,99,22,170,189,14
6,22,133,922
1650 DATA3,141,101,22,232,189
,146,22,856
1660 DATA133,4,141,102,22,160
,0,177,739
1670 DATA3,240,82,141,98,22,2
05,100,891
1680 DATA22,208,16,200,177,3,
217,50,893
1690 DATA3,208,8,204,100,22,2
40,23,808
1700 DATA76,212,20,238,98,22,
173,98,937
1710 DATA22,24,101,3,133,3,16
5,4,455
1720 DATA105,0,133,4,76,198,2
0,173,709
1730 DATA97,22,240,3,76,26,19
,141,624
1740 DATA62,255,88,32,128,22,
162,28,777
1750 DATA160,21,32,105,22,96,
32,78,546
1760 DATA79,84,32,70,79,85,78
,68,575
1770 DATA13,13,0,32,0,141,62,
255,516
1780 DATA88,169,13,32,210,255
,32,210,1009
1790 DATA255,169,5,32,210,255
,32,128,1086
1800 DATA22,169,158,32,210,25
5,162,15,1023
1810 DATA160,21,32,105,22,173
,97,22,632
1820 DATA240,4,32,64,17,96,17
3,96,722
1830 DATA22,240,42,32,171,255
,169,4,935
1840 DATA32,120,20,162,4,32,2
01,255,826
1850 DATA32,128,22,169,13,32,
210,255,861
1860 DATA169,4,32,195,255,32,
174,255,1116
1870 DATA32,204,255,162,8,32,
198,255,1146
1880 DATA169,8,32,180,255,173
,94,22,933
1890 DATA208,1,96,162,156,160
,21,32,836
1900 DATA105,22,32,204,255,32
,225,255,1130
1910 DATA240,11,32,228,255,20
1,89,240,1296
1920 DATA37,201,78,208,240,16
2,8,32,966
1930 DATA198,255,96,65,68,68,
32,87,869
1940 DATA79,82,68,32,84,79,32
,76,532
1950 DATA73,83,84,32,60,89,47
,78,546
1960 DATA62,32,63,13,13,0,162
,8,353

1970 DATA32,198,255,169,0,56,
237,198,1145
1980 DATA22,141,103,22,169,25
3,237,199,1146
1990 DATA22,141,104,22,201,0,
208,30,728
2000 DATA173,103,22,201,65,17
6,23,162,925
2010 DATA224,160,21,32,105,22
,96,78,738
2020 DATA79,32,82,79,79,77,32
,76,536
2030 DATA69,70,84,13,13,0,120
,141,510
2040 DATA63,255,173,198,22,13
3,3,173,1020
2050 DATA199,22,133,4,238,100
,22,160,878
2060 DATA0,177,3,172,100,22,1
45,3,622
2070 DATA165,4,205,102,22,208
,7,165,878
2080 DATA3,205,101,22,240,11,
165,3,750
2090 DATA208,2,198,4,198,3,76
,0,689
2100 DATA22,160,0,206,100,22,
173,100,783
2110 DATA22,145,3,200,185,50,
3,145,753
2120 DATA3,204,100,22,208,245
,238,100,1120
2130 DATA22,174,99,22,232,232
,224,54,1059
2140 DATA240,22,189,146,22,24
,109,100,852
2150 DATA22,157,146,22,232,18
9,146,22,936
2160 DATA105,0,157,146,22,76,
62,22,590
2170 DATA141,62,255,88,96,0,0
,0,642
2180 DATA0,0,0,0,0,0,0,0,0
2190 DATA134,5,132,6,160,0,17
7,5,619
2200 DATA240,12,32,210,255,23
0,5,208,1192
2210 DATA2,230,6,76,111,22,96
,162,705
2220 DATA0,236,100,22,240,10,
189,51,848
2230 DATA3,232,32,210,255,76,
130,22,960
2240 DATA96,200,22,201,22,202
,22,203,968
2250 DATA22,204,22,205,22,206
,22,207,910
2260 DATA22,208,22,209,22,210
,22,211,926
2270 DATA22,212,22,213,22,214
,22,215,942
2280 DATA22,216,22,217,22,218
,22,219,958
2290 DATA22,220,22,221,22,222
,22,223,974
2300 DATA22,224,22,225,22,226
,22,0,763
2310 DATA0,0,0,0,0,0,0,0,0
2320 DATA0,0,0,0,0,0,0,0,0
2330 DATA0,0,0,0,0,0,0,0,0
2340 DATA0,0,-1

USA Today

There are a lot of strange peripherals available for C64s in the States. Here's a cross section just to whet your appetite.

By Lewis Tilley

Do you have that tired, run down feeling? Does the big guy kick sand into your face at the beach? Do you want to compete better? Plug a *Bodylink* into your Commodore's cartridge slot and hook into the latest in sports training. This peripheral consists of the programs plus a "standard EMG sensor and lead set, head band and three electrodes" which you place against the part of the body you wish to monitor. The result reads out on your screen with the aid of the two software cartridges included.

Computerised Muscle Exerciser and Trainer or *COMET* is an electronic muscle builder which comes as an extra. A cardiac exercise and stress reduction package are also available. Prices run from \$149.95 for the basic package up to \$239.95 for the stress reduction gear. Mail orders to: Bodylog Inc, (see Touchline for address).

There is an italicized sentence in the firm's advertisement which will be reading more often as the use of computers expand into the mass markets: "Knowledge of computers or computer programming is NOT necessary to use *Bodylink*." That, for you, fellow!

To continue your physical education course, don't forget the latest in footwear. Puma's *RS Computer Shoe* has a computer chip built into its heel. After each training run you connect up to your 64 for a readout of the run record. The time, distance and calories you used will be fed in for a comparison with your past data and future dreams. Only \$199.95 for a pair.

Now, let's see. We have the electrodes on your head, a computer chip on your feet, if you'll just stick your hand into this lightweight, cotton glove its sensors will do everything a joy stick will do for you and more. It's

called *Hand Command* and comes from ShareData and costs \$40.

Gone Fishing

Maybe you aren't a "jock", which is an Americanism for "athlete" coined from their supporters. Maybe you like to fish. Got just the thing for you. *The Computerised Fisherman's Fight Recorder* fits on to your pole to use its chip to remember how long and how hard you worked to catch that fish. Available from the US merchandiser, Hammacher Schlemmer, for \$75.

But seriously Folks

Heavy, heavy, heavy is this very different printer interface, *Device One* from Progressive Peripherals and Software at a price of \$119.95. The price is high, but the features overwhelmed the reviewers of this new attachment. It contains 32K bytes, a 6803 8 bit micro-processor and its own power source. 16K of that memory is used as a print buffer but it doubles in brass when it stores eight different fonts in that buffer as well. A utility disk comes with these fonts plus 22 varieties of the standard 8 x 8 font and an editor so that you can design your own. This graphics interface which links a Centronics printer to the serial bus of the Commodore deserves a thorough review of its abilities.

Device One is a challenger to *Super Graphix* by XETEC which has offered its high technology to Commodore users for some time now. You might check it out from XETEC Inc. at \$99.95. Their disk includes 27 fonts to be used with the interface.

If your major printout problem is impatience, you can get three versions of *Serial Box* which stores in a 64K buffer while printing to a Commodore Compatible printer. The *Serial Box-Plus* is serial to parallel with 64K

buffer, and the *Box-Max* is to a parallel printer and gives a massive 256K buffer. All of these include a font design and utility program called *Font Factory*. They are *GOES* compatible. R.J. Brachman Associates Inc. sell these at \$79.95, \$149.95 and \$219.95 respectively.

Kaltek Labs, down in Puerto Rico, have devised an inexpensive way to scan a photo or drawing without the use of a TV camera. You attach a scanning head to your printer, or any typewriter, and connect to the 64's user port. The *Scammadore* system takes over to produce an image with its software which can be manipulated. The resolution is no better than might be expected, but it can be adjusted in tonal levels, exposure and contrast. Price for the complete kit is \$54.95 from Kaltek Labs.

The best is yet to come. Berkeley Software, which revolutionised the new 64C, is working on an Apple *LaserWriter* driver for GEOS. The *LaserWriter* is a \$5000 printer which responds to a text language from Apple called *PostScript*. It prints typeset quality text. Here in the States, some shops are offering the services of print-printouts on their *LaserWriters* from your disk.

Touchline

Bodylog INC: 34 Maple Ave, Armonk, NY 10504.

Sharedata: 7122 Shady Oak Road, Eden Prairie, MN 55244.

H&H Enterprises: PO Box 2672, Corona, CA 91718.

Progressive Peripherals: 464 Kalamath Street, Denver CO 80204.

XETEC INC: 2804 Arnold Road, Salina, KS 67401.

R.J. Brachman Associates: PO Box 1077, Haverton, PA 19083.

Kaltek Labs: Adjuntas, PR 00601.

Now Comics: PO Box 8042, Chicago, IL 60680.

EREBUS

£8.95

COMMODORE 64/128

This smooth scrolling blast-'em game features the very best in fast arcade action by Steve Lee (*author of the Falcon Patrol series and Shogun*) with stunning graphics by Martin Wheeler (*famous for Spectrum Dan Dare and the original designer of Sorcery*). It is a multi-sectioned game with many varieties of tough aliens to eliminate. You must fight through each wave in your highly manoeuvrable spherical space fighter and save Earth from the horrible fate of the noxious nerve gas being produced on planet Erebus.

Invest in some real action for your Commodore 64/128.

Please send me a copy of **EREBUS** for the Commodore 64/128 (cassette only)

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I.Q.

In this new regular feature we bring you the best of strategy and adventure games together with some useful hints on how to improve your play.

The Pawn

Originally written for the Atari ST, *The Pawn* had rave reviews both for its graphics and for its complex parser.

Rainbird is the up-market arm of British Telecom's software interests and as with *The Jewels of Darkness*, this program is no cheapy at £19.95. But, considering that you get two disks, plenty of supporting written matter and an A3 sized poster, it is not bad value.

Instructions to play the game come in two small booklets, one Commodore specific and the other a general gameplay guide. There is also a very well produced 55 page book containing the background story and several pages of encyphered hints for the difficult bits.

The first option, that is highly recommended, is to make copies of two Pawn disks, henceforward to use these copies and retain the originals safely stored away. There is even a copy program included so that you need no additional utilities to achieve this.

This story is a strange mixture of ancient and modern, with old favourites such as dwarves, a missing princess, and all powerful magician and an ice castle with no doors. What this land of Kerovnia also has, are many oblique references to a more modernistic society that tends to replace the classic framework with a satirical identity which is both amusing and witty.

The final aim of the game is not spelt out, but with an unpopular king, a general election in the offing, some murky trading in the drinks market and groups of banished dwarves in the wings not to mention Kronos the Magician – anything is possible.

In common with those superb adventures from Infocom, this program makes a great deal of use of the disk drive. This regular disk access at most keyboard entries does mean that each move takes time to reach some form of conclusion, especially when large pictures are to be created.

The graphics are excellent but the full picture only allows three lines of text beneath it – so even more time is lost as you try to assimilate a number of lines of text, three at a time.

The instructions acknowledge this problem and recommend using another graphics mode, with only occasional peeks at the large pictures! One thing is certain, *The Pawn* offers a great variety of viewing and editing controls that should satisfy the most demanding player.

It is possible to get into quite a muddle with all the picture controls, whereby you are looking at a picture that is not that of your present location. GRAPHICS NORMAL



puts everything right and you may then start your choice of graphics mode all over again.

The Pawn gives you a number of editing controls, a most useful one being the facility for calling back your last command for re-editing. Communicating with the game is fairly easy, as the parser recognises many different ways of saying the same thing. Leaving the Guru's hut may be accomplished by any of the following: LEAVE HUT, GO EAST, E, GO E, OUT, O, EXIT, EXIT HUT or EXIT EAST.

These are very simple commands but an example given in the instructions shows that the parser will also accept such a tortuous command as GET ALL EXCEPT THE CASES BUT NOT THE VIOLIN CASE THEN KILL THE MAN EATING SHREW WITH THE CONTENTS OF THE VIOLIN CASE! The parser will also understand when an object already specified, is to be used again: GET SHIRT THEN TIE IT TO RAKE.

Although this all sounds wonderful and indeed makes life that much easier in most cases, do not assume that the command interpreter is all powerful. You must still retain the true adventurer's cynical attitude and double check your surroundings.

An example of this may be found when you first arrive in Kerovnia. You are wearing jeans and a T-shirt and have a mysterious silver band sealed around your wrist. Obviously you immediately run an inventory check, this tells you nothing more. You know the program is renowned for its

parser so try FEEL IN POCKETS – great, the answer is “The pocket is soft”. However it takes three more commands to ascertain what is in there.

If you get stuck, there are a number of hints given to help you. These are in the form of a series of two character blocks: AN Y5 N6 DO GO 5B. Type in HINT and you will then be asked to type in this code. There are usually three sets of code for each potential question, the first often gets a flippant response, the third is usually quite useful.

There will be several times where you have to talk to characters you meet along the way. The parser again offers you a choice of how to go about this. There is a useful command EXITS that will list all possible directions of movement from your present location. AGAIN repeats the previous command and SCORE gives you your current score and the maximum possible score.

With all these facilities to be shown off, what is the adventure itself like? There are lots of laughs, plenty of tongue in cheek satire and a reasonable difficulty level. Draw maps carefully as movement from one location to another is not always quite as you would expect it to be. SAVE your game position regularly (you'll need a previously formatted blank disk).

Altogether an interesting experience with a true adventure dressed up in the most modern mixture of programming technique and off beat humour. We will have to wait and see if these higher priced super-products can stand the competition from cheaper and less elegantly programmed adventures. For Magnetic Scrolls, *The Pawn's* programmers, I hope so – I'm looking forward to seeing their next offering.

P.F.

Questron

Those of you who enjoy the *Ultima* series of adventures may well find that US Gold have come up with another winner in the same mould. *Questron* is a fantasy adventure game written by Strategic Simulations Inc in the USA. It is disk only but this is two sided – so there is plenty of program there to be explored.

The land of Questron has had a distinctly turbulent past. Everything fell apart at the seams some hundreds of years ago when one of the King's two chief wizards finally took the left hand path and became completely evil.

From that moment on, a greater and greater number of vile monsters invaded the countryside. The population began to seek shelter in underground towns, as these were the only places they could be sure of defending. Many were the knights that went out in the hope of defeating the evil Mantor, but none returned.

The countryside and towns are shown in plan view and dungeons in 3D. The symbols representing plains, jungle, mountains and swamps also look familiar.

This plan view takes up about two thirds of the display, with a number of action options to its left together with a brief status of the character's vital statistics. Reports of what is happening and your input commands appear on the four lines at the bottom of the screen.

Control may be entirely from the keyboard or a mixture of joystick and keyboard. All keyboard action commands are single key presses, so the action is quick and simple to master. Whilst roving around you have such commands as: Arm (choice of weapon), Dismount, Fight, Hold Item (for

use by Operate), Speak, Wear, Rob, Unlock, Take and Examine.

As you move your character, the screen scrolls past, disclosing further areas of the country. There are a number of towns to visit and in each you will find shops that sell different means of transport ranging from horses and llamas to rafts, clippers and eagles.

The towns also have two other places of great importance, Jails and Casinos. Bribe the warder and he will let you talk to one of the prisoners.

The Casinos offer three types of gambling 'double or nothing', 'blackjack' and 'roulette'. A cool head and careful strategy can make you a rich man fairly quickly. Gold is an important part of the game and the two main sources are by killing monsters and by gambling.

Food has to be bought at regular intervals and as you progress, you may also find a use for superior weapons and equipment. Be wary in the Casinos of winning too much, too soon. Win over 2000 gold pieces, the gambling is closed and the town guards will attack you. They are fairly tough and if you have not yet built up your hit points, you may come to an early end.

There are several Cathedrals to visit. These contain renegade magicians from the past and they are able to help you in several ways.

You start out with 15 points of your five main attributes: strength, stamina, dexterity, intelligence and charisma. These attributes may be modified as play proceeds and you become wiser to the ways of Questron.

There is one other main site for you to find on the mainland and that is the King's Castle. Here you will find the wizard Mesron, almost equal in power to the evil Mantor. Talk to him and he may well help you on your way.

Eventually you will want to talk to others in the castle but as they are behind locked doors, this is no easy task. First you will have to steal the right keys and this will bring any nearby guards hotfoot for the kill. You will have to have found a means of replacing your certain loss of hit points.

Once you have reached a high enough position in the land, you will be requested to seek out and destroy Mantor in his land of evil across the seas. Now you will have to find a way through those areas of thick choking fog that have so far evaded your exploration.

This evil land far to the west, has even today, got a few trading posts. Here you can buy various magical items and



several weapons that may be useful against the many new varieties of monsters found above and below ground. The Dungeons are rife with traps and all manner of nasty things, fortunately there are a fair number of treasure chests and magical caskets. You may even be lucky and find a compass.

For all those physical types that delight in roaming off into the great blue yonder, polish your boots and oil that sword, Questron needs a hero. Just remember, grab as much gold as you can, never talk to the guards and leave pinching the King's gold until you are sure of yourself. P.F.

Moonmist

You receive a letter from one of your old friends Tamara Lynd in which she can't wait to tell you her news. She has become engaged to an English Lord no less and is going to live in Tresyllian Castle out in Cornwall - a lovely old place and reputedly haunted.

How things change! Eight days later, a second letter arrives and the tone of happiness has been replaced by one of sheer terror. Tamara is convinced that someone is trying to kill her. There have been two attempts on her life so far. Also, several of the guests at the castle have reported seeing the White Lady, especially after the unfortunate drowning of one of Lord Jack Tresyllian's former girlfriends. As you have a reputation as something of an amateur sleuth, she begs you to come over and see if you can clear things up.

So the story is set for *Moonmist*, the latest detective story from those masters of the adventure game 2 Infocom (distributed in the UK by Activision). The game is set at introductory level and is ideal for those of you who don't quite fancy yourselves as Sherlock Holmes just yet. At the beginning, you are prompted for your name and title, thus determining your sex. All the responses within the game are then adapted around your answer. You are also prompted for your favourite colour for there are no less than four different variations within the game so that it is not something that you just play once and forget about.

The game starts with you driving up outside the castle gates. You quickly meet some of the other guests before going to your room to dress for dinner. No sooner have you taken a couple of bites than the plot thickens when a secret tape recorder plays a message from Lord Jack's late, eccentric uncle in which he states that there is treasure

hidden somewhere within the castle and grounds.

Treasure, a ghost with some very odd behavioural habits, the death threats to Tamara and the mystery of Deirdre's drowning when no body was ever discovered should keep even the most brilliant detective quiet for a bit. You will have to go round the castle, searching for clues and secret passages and asking the guests what they know about various people or objects.

For once, the atmosphere created within the game is not up to the usual Infocom standards. The main reason for this is that the Americans have no idea how the British upper classes behave save what they have seen at the pictures. A Coldstream Guards officer sounds more like Eliza Doolittle's father in *My Fair Lady* whilst the butler does a very good impression of Bertie Wooster rather than Jeeves. These idiosyncrasies aside, the rest of the game is well up to standard with reams of excellent text descriptions and (thank goodness) no graphics.

Infocom is also famous for the way in which the games are packaged and *Moonmist* is no exception. A book on the ghosts of Cornwall, a tourist brochure to the castle, Tamara's two letters and an iron-on transfer for a tee-shirt are all included. If you have always fancied yourself solving a major crime, or four in this case, you could do a lot worse than discover why *Moonmist* has helped to make Infocom the best adventure writers in the business by a long way. G.R.H.

Silicon Dreams

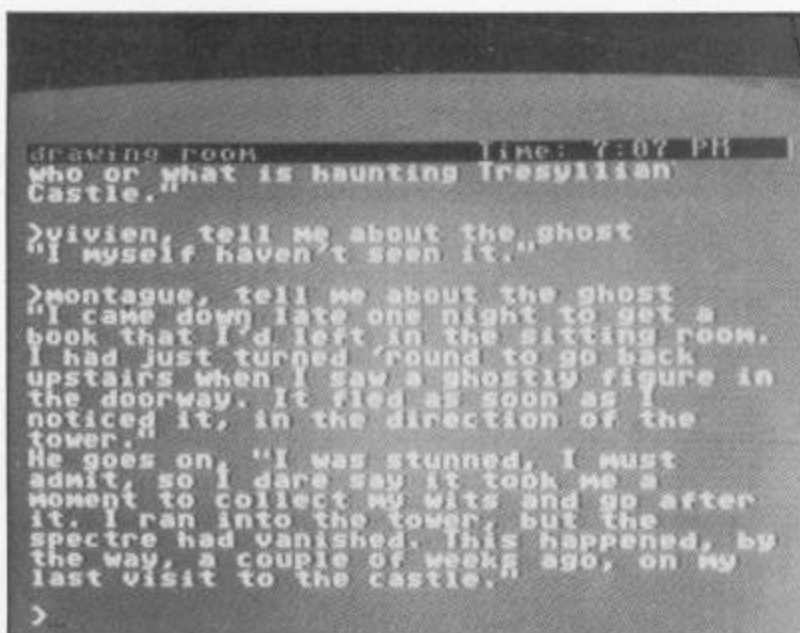
For some reason or other, most adventure plots have been more concerned with orcs and wizards rather than spaceships and lasers. For the discerning sci-fi buff, there has been a distinct lack of decent games. Now, their wait is over for Rainbird has put together three of Level 9's old games into one large compendium.

Silicon Dreams is the title and the games included are *Snowball*, *Return to Eden* and *The Worm in Paradise*. The games have been re-written and expanded to make use of Level 9's latest parser and compression techniques. In the case of *Snowball*, graphics have been included for the first time.

You play the part of Kim Kimberley, secret agent extraordinaire. In *Snowball*, you are charged with protecting an interstellar from your hibernation, you are aware that something is dreadfully wrong but have no idea what. Sinister nightingales lurk and pursue you as attempt to make your way to the control room and stop Snowball 9 from crashing into the planet Eden. The fate of a mere two million people lies in your hands.

Although you managed to save the ship, it was sabotaged and several powerful people have put two and two together and made five when they found you guilty of sabotage. Sentenced to death, you managed to escape and became the first of your race to land on Eden. You must reach the robot city of Enoch and stop them from destroying Snowball 9. As if that wasn't enough, the crew of Snowball are still after your blood.

In *Worm in Paradise*, the setting is the city of Enoch 100 years later. The organisation of the city is somewhat strange being based on zero taxes, instant fines for crime and a booming business in spare parts for transplant surgery - you are immortal if you can keep replacing the necessary bits.





You start off trying to make money but there is something definitely wrong. Can you, a mere citizen manage to save the world?

The games allow complex sentences to be input and the parser supports such features as 'get all' and the use of 'it' as in 'get box and open it'. You can save the game to tape or disk as well as more temporarily to RAM. Another useful command is 'OOPS' which allows you to correct those irritating little mistakes that just happened to kill you by stepping back a move. The games come complete with full instructions and a 42 page novella entitled 'Eden Song'.

Even if you already own one of the adventures, you should still seriously consider this package in its updated form. If you haven't got any of the games, then *Silicon Dreams* has got to be one of the bargains of the year at £14.95.

G.R.H.

Battalion Commander

If you've ever fancied yourself as a tank commander, here's your chance to prove that you really are a latter day Rommel. Not only do you get to control a tank, but a whole armoured battalion.

The setting for this latest wargame from the US Gold/SSI stable is a land battle at some stage in the near future. You can choose to play American, Russian and, unusually, Chinese forces over a set of variations that is absolutely mind-blowing. If the problems of controlling an entire battalion was not hard enough in the first place, the whole game takes place in real time so there is no sitting back slurping a cup of coffee and pondering over your next move.

There are five basic scenarios. Novice is just there to let you get used to the controls. Pursuit and exploitation is an incisive thrust into enemy territory. Meeting engagement is a chance encounter. Attack sees you trying to break through the enemy lines as you try to reach a key objective and defence is the exact opposite. You can choose which side you want to be, which of 40 different terrains you wish to fight over and whether or not you want to alter the relative strengths of the two sides.

Control of your units is very straightforward. One letter to designate the unit and a second to issue the order. There is also a moving cursor to designate the area you wish to shoot at or move to etc. You can command include moving, firing normally, providing suppressive fire or creating a smoke screen. Enemy units only appear on the map when they have actually been discovered.

Apart from your tanks, you may also find yourself in control of supply trains, anti-tank units, scouts, heavy mortars and engineers.

The game looks deceptively easy. Starting at novice level, nothing happened for a few moves until I found the enemy and destroyed it without taking any damages. As soon as I started playing for real, everything was on a much grander scale and I got wiped out without any apparent effort on behalf of the enemy, most of whom I never even saw. Coming complete with an excellent 20 page instruction booklet, *Battalion Commander* is one of the best wargames yet produced for the C64.

G.R.H.

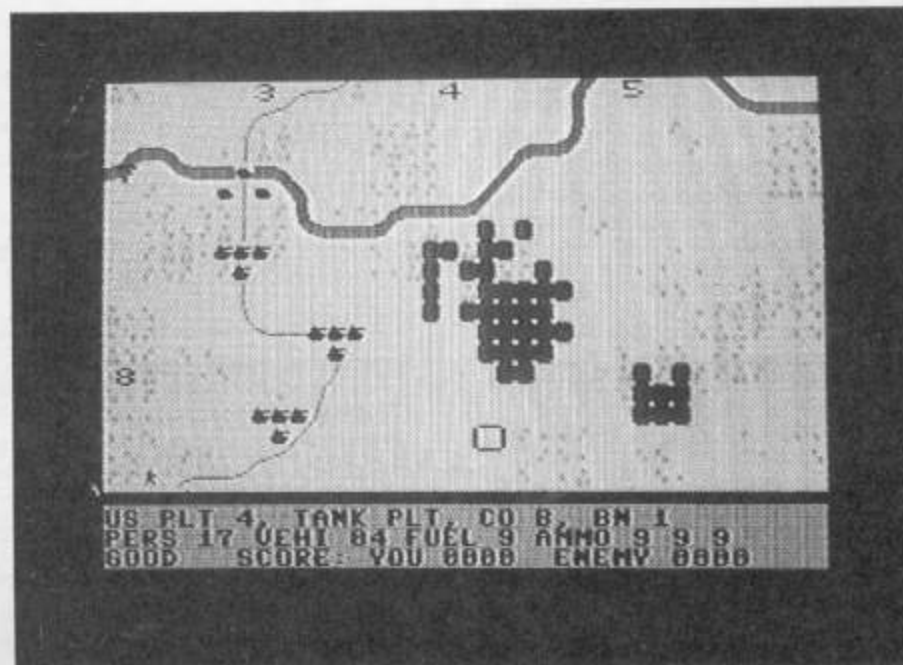
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US Gold: Units 2/3, Holford Way, Holford, Birmingham B6 7AX. Tel: 021 356 3388.

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Hack Pack 128

An excellent extension package for the C128

By Stuart Cooke

When the C128 was launched, its improved version of Commodore Basic was widely acclaimed. It was now possible to produce sound and graphics with far greater ease than with the outdated Basic of the C128's little brother the C64.

A plethora of Basic extensions are available for the C64 to make it easier to use, even *Your Commodore* has published some in the past. However, with the new powerful Basic of the C128 you would think that it would be unnecessary for anyone to produce an extension package for the C128, Systems Software obviously think differently as they have produced an excellent extension for the C128 called *Hack Pack*.

Hack Pack can be split into three distinct sections and it is up to you which ones you actually LOAD and use. Available for use are a Basic/programming toolkit, a RAM-Disk and a program compressor.

The RAM-Disk

This is probably the strong point of the package and a must for anyone who requires instant access to small programs.

The C128 has, as its name suggests, a large amount of memory. In most applications not all of this memory is required by the user and is wasted. The RAM-Disk option of *Hack-Pack* allows you to set up this area of memory as a disk-drive, of course it has no moving parts but it is possible

to SAVE programs in this area, you can get directions of files that are stored in there and most of the normal disk commands work.

If you are using Basic the RAM-Disk is allocated two blocks of memory at the top of banks zero and one. This does mean that the amount of memory that is used for Basic is reduced but this doesn't affect your programs that much since you would be very unlikely to have a Basic program that takes up all of the available memory.

Should the RAM-Disk clash with your own programs then commands do exist that allow you to locate it

wherever you want in memory. I wouldn't expect a novice programmer to understand how to go about this but should you feel competent the manual is very clear and you should have no problems.

As you are no doubt aware the Commodore disk drive is set up as device number eight. To avoid a clash with this the RAM disk is accessed as device number nine, again this can be changed by the user.

So what is the advantage of using a RAM-DISK? Firstly there is the advantage of speed. A program can be SAVED and LOADED into and from a RAM-Disk almost instantly. This has the advantage that if there are a number of programs that you are going to require a lot you can swap the one that you are using very easily.

The COPY command has been extended to allow you to copy between the RAM disk and a normal disk drive. It is possible to COPY single files between both the normal and RAM disk however the most useful feature is the ability to make copies of all the files on the RAM disk on a normal disk with one simple command.

Toolkit

As I have already stated it is difficult to think what commands are missing from the C128's Basic. System Software has however managed to select some extremely powerful and useful commands for this extension.

Should you want to make changes

```
10 REM *****
*
20 REM * THIS IS A DEMO PROGRAM
*
23 REM *****
*
30 FOR X = 1 TO 1000
35 PRINT "THIS IS A DEMO PROGRAM"
40 NEXT X
45 PRINT
46 PRINT
50 REM
60 FOR Y = 1 TO 1000 STEP 3
70 PRINT Y;
80 NEXT
```

AFTER COMPACTING

```
30 FORX=1TO1000:PRINT"THIS IS A
DEMO PROGRAM ";NEXTX:PRINT:PRIN
T:FORY=1TO1000STEP3:PRINTY;:NEXT
```

FIGURE 1

within a Basic program then it is actually quite difficult to find the area of the program that you wish to make changes in. Wordprocessors get around this with a SEARCH and REPLACE command which allows you to search through a document for the occurrence of any word and turn it into another one. *Hack Pack* has a FIND command which will allow you to search through a file for a specific word. There is even an option that allows you to specify which section of the program is actually searched.

An extension of the FIND command CHANGE, allows you to search a program for a specific word and change it into another.

DUMP will print a list of all variables, functions and arrays that have been set up to be printed out. This is extremely handy when debugging a program since it allows you to see at a glance the state of all variables.

INFO will give you some interesting data about the status of the computer. Printed out after an INFO command are:

Number of bytes occupied by Basic.
The number of bytes occupied by variables.

Number of bytes occupied by arrays.
Number of bytes occupied by strings.
The number of bytes available for Basic text.

The number of bytes available for variables, arrays and strings.

MERGE will allow you to MERGE two files together in memory. This is extremely useful if you have a number of subroutines stored on disk since you can add them to your latest masterpiece with this command.

TYPE will take an ASCII file from disk and print it on the screen. SIZE will display the size of the specified file in bytes and can be used with any type of file and the QUIT command will deactivate the toolkit.

Compressor

When you are writing a program in Basic it is useful to space the program out as much as possible with a small number of statements on each line. To

make it even clearer you may even REM the program to make debugging easier. A more efficient and memory saving method of program writing is to place numerous statements on one line. What a compressor does is take a specified file, remove all unnecessary spaces and all REM statements then it reduces the number of lines in the program by placing as many statements on each line as possible.

Figure 1 shows a program before it has been passed through the compressor and after it has been compressed.

Hack Pack is an extremely useful addition to the collection of a serious C128 owner. Even in the short time that I have had it for review I have found it indispensable and use it regularly, the RAM-Disk being exceptionally useful.

Touchline

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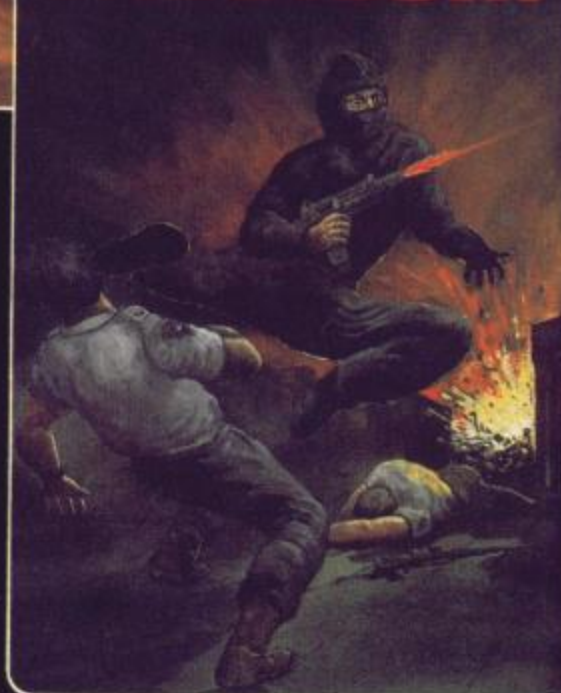
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Gauntlet

The most popular arcade game in the last 12 months has been brought to the small screen. Enter a world of heroes, magic and lurking danger.

By Marie Curry

Gauntlet is a two player arcade game which is totally addictive, as many of you will know from the hours you've spent shoving your hard earned pennies into arcade machines.

Now it's been released for the C64 by US Gold and is set to be a number one.

It's a one or two player game, but take my advice and stick to the two player option. There are two reasons for this, the first is that you'll get much further with it and the second is that it's a great deal more fun. You can decide to help or hinder each other (you play simultaneously) but watch out for treachery if you're supposed to be co-operating. If you're both low on health point then there could be a mad dash for the nearest succulent turkey to pep you up and the loser may dwindle away to a pile of bones!

When you start you are given a choice of four characters. You can choose to be either Thor the Warrior, Thyra the Valkyrie, Merlin the Wizard or Questor the Elf. Each has different attributes and strong weak points. For instance, Thor's got great armour and is very good at hand to hand combat, however he's pretty poor on the magic front. Merlin, on the other hand, has no magic, can't fight very well with his bare hands but good at zapping people.

Once you've decided which persona you want, then you can go straight into the game. Monsters abound. Ghosts, Grunts, Demons, Lobbers, Sorcerers and Death. Each have different ways of draining your energy and they all come in droves except Death, although numbers of these increase on the higher levels.

When you first play the game you may be quite daunted by the numbers of villains which you are expected to destroy in order to work your way around the mazes. The best way to get around this problem is to head for the generators. These are little square blocks which look different depending on which kind of monster they are churning out. Shoot these and the number of monsters can be controlled. Get rid of all of them and you can safely walk around a section to explore.

In and around the dungeons are objects to pick up to increase your chances of success. Potions are very useful as they are the only thing which can kill Death (which sounds like a contradiction in terms but isn't in this context). Special Potions give the player special abilities. You can also grab extra armour, magic power, shot speed, shot power, fight power and pick up power which are pretty self explanatory.

Food is probably the most important thing to collect as this keeps you going. There are joints of meat lying around and bottles of cider. Be careful not to shoot the cider, before you can get to it. Poisoned cider looks slightly different so

watch out for it since it decreases your health points. There are keys to open doors and loads of treasure to pick up. An amulet will make you invisible for a while. Traps are glowing patterns on the floor which remove some walls and transporters take you from one area of the maze to another. Exits are labelled black squares which move you to another level. It will not necessarily be the next one, you can skip around quite a lot which means that the game has little chance of getting boring as there are hundreds of levels. There are also Treasure Rooms which you stumble on at random. These are bonus screens with no villains but there is a time limit. You must collect as much treasure as possible and find the exit. The limit is usually 10 seconds.



The whole game is impossible to map, there are just too many mazes and it wouldn't help very much anyway. All the dungeons are very different in layout and some of them are extremely complicated. Some have only one exit, others have several.

There are many different ways to play the game. You can go for a high-score, you can try and get to the very high levels, you can work alone or in partnership, all have their own advantages and all are fun. It's a fascinating game and well worth every penny.

Touchline

Title: Gauntlet. **Supplier:** US Gold, Units 2/3 Holford Way, Holford, Birmingham B6 7AX. **Tel:** 021 356 3388. **Machine:** C64. **Price:** £9.95 tape, £14.95 disk.

Originality: 6/10. **Graphics:** 7/10. **Playability:** 10/10. **Value:** 10/10.

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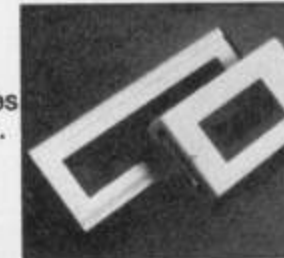
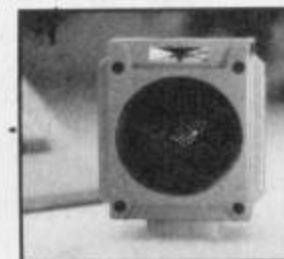
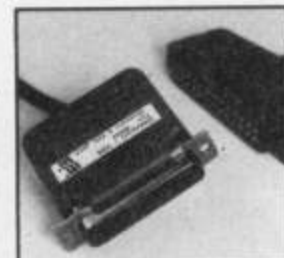
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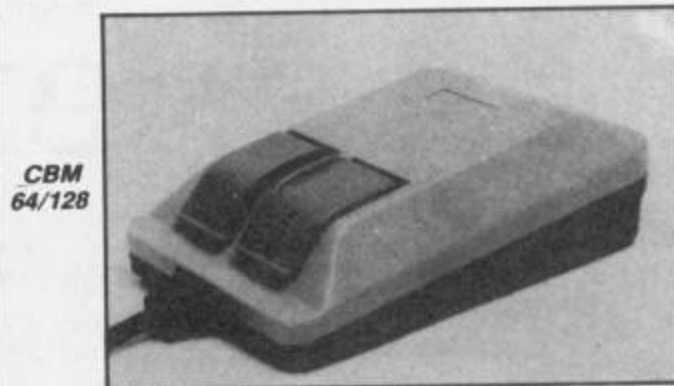
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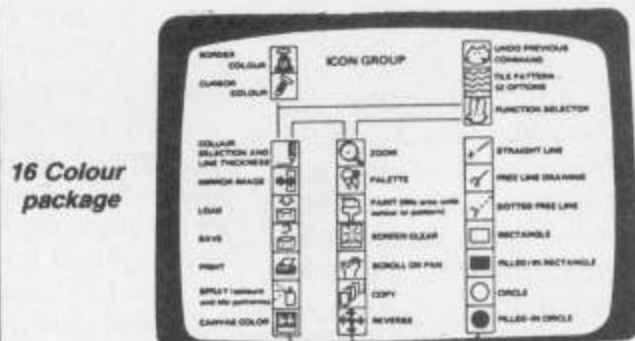
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Merlin Assembler

Assemblers aren't very common for the C16 and plus/4. However we've managed to have a look at this one from Wizard Software.

By Paul Eves

Merlin Assembler is a full 7501, two pass assembler for the Plus/4 and C16. It comes both on Tape and Disk. Wizard have gone for a green screen display once the assembler is activated. This is for 'eye comfort'.

The program assumes that the user has a knowledge of 6502 machine code, so if you are not familiar, I would suggest you acquire some before attempting to use this package. Because Merlin resides at \$1000 to \$21000, Basic has been moved to \$2101. Once you have a source listing ready to assemble, you just type ASM and press return.

Once loaded, Merlin leaves the Basic intact. Therefore you may still use the already familiar editing features of Basic. Basic may also be integrated in the source listing. However, all Basic lines must be after the END statement, and are activated by GOTO and not RUN.

Program Designing

When designing a program using Merlin, the first instruction must be the COM command. This command tells the assembler where to start assembling in memory from. If this command is missing then your program will not be assembled e.g.

```
10 COM $5000
20 LDA # $FF
30 END
```

This would begin assembly from \$5000 onwards. In other words the instruction `lda # $ff` would be the first instruction at \$5000.

As COM is the first instruction of any assembly program, END must be

the last. If END is missing the assembler will not know when to stop assembling. In this event, should you have a Basic program after your source code, the assembler will flag every unrecognised line as a syntax error.

The LIST command allows you to see what has just been stored into memory. If you do not wish to see everything, you may insert a STOP command e.g.

```
10 COM $5000
20 LIST
30 LDA # $FF
40 STOP
50 LDY # $20
60 STA $D6
70 END
```

The above program would produce the following display on the screen after the copyright notice:

```
5000 AD FF LDA # $FF
READY
```

Note that lines 50, 60 and 70 have not been listed, this is because of the STOP command. If you wish to LIST the whole program then leave the STOP instruction out.

Labels

The use of labels in assembly language programming is essential. Notice I said Assembly Language programming and not Machine Language programming. Nobody in their right minds would attempt Machine Language programming these days, unless they were from the old days of large complex machines.

Labels can be used anywhere within your source code, but must be after the first COM command. All

labels must be preceded by a full stop, e.g. `.LOOP` and `.GOT` are valid labels, but `LOOP` and `GOT` are not. The use of labels makes the task of the programmer that much more enjoyable. Consider the following small program:

```
10 COM $5000
20 LDA # $FF
30 JSR .DELAY
40 LDA # $01
50 LDX # $00
rest of program here
210 .DELAY DEX
220 BNE .DELAY
230 RTS
240 END
```

Instead of having to calculate forward or backward addresses, you just put in your labels and the machine does the hard work for you. Labels also make for better program design in my opinion.

Two instructions that are pretty useful are `*TX` and `*DA`. These allow for the storage of data as either ASCII values or NUMBER values e.g.

```
*TX "YOUR COMMODORE IS TEXT"
*TX "SO IS THIS"
```

This would store the above two sentences in memory under their ASCII codes.

```
*DA $50,$FF,$255,$80FF,$32768
```

This would store the numerical values into memory. Note the mixture of both hex and decimal numbers. (As is standard, the '\$' is put in front of any number that you wish to be taken as hex.)

Comments

Another important feature of assembly programming is to somehow put comments within the program. This is so that both the programmer and anyone reading the listing can see what's going on. This is far more important in assembly programming than in Basic programming. The way we achieve this with *Merlin* is by the use of remarks. A ';' denotes a remark. A remark can be left in the source listing on a line by itself. Alternatively, you can put a remark at least one space after the instruction with either way ';' or without it e.g.

```
10 LDX # $00 ;Zeroise the X reg
20 ;Ready for indexing a list
30 LDY # $00 zeroise the Y reg
```

All the above are valid remarks.

On assembling, any errors found are reported back to the user on screen. The format being LINE:NUMBER :THEN THE ERROR. For example:

20 LGY # \$00

would produce the error

LINE:20;SYNTAX ERROR.

Obviously there is no instruction LGY.

Although this program is not as powerful as the Assembler I am used to (HS64 and PAL to name but two), I found it easy and quick in execution. Beginners to Assembly programming will find *Merlin* a very good aid to the development of their programs.

Extra

There are two extra points where I think this particular assembler scores over most others, that is the assembler has some intelligence of its own. To make this more understandable, look at the following short program.

```
10 LDX # $00
20 LDY # $DD00
30 LDA ($DC),X
40 LDA ($DC),Y
```

Line 10 is legal and valid. Line 20 is not valid, however the assembler would assume that you meant LDY \$00, in other words it ignores the HI order byte and loads the accumulator with the LOW order byte. Lines 30 and 40 are both common errors that you will make, (Indirect index addressing always manages to confuse people). On encountering these types of errors, the assembler would assume that you meant 30 LDA (\$DC),Y and 40 LDA (\$DC,X) respectively. This feature of the assembler is, in my opinion, its greatest asset.

I have to be totally honest, and say that as my knowledge of the Plus/4 and C16 is somewhat restricted, I could not give this package the kind of indepth trial that I would prefer. However, from what I have seen of it so far I have no hesitation in saying that it is a good buy.

Touchline

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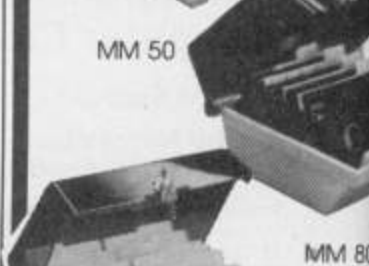
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Games Reviews

As always there is a wide variety of games currently available. We've picked out a selection for you to peruse.

EREBUS

I know you're not going to believe this. Earth is in danger again and you've got to save it!

Erebus is a distant planet used by man to reprocess dangerous waste. Now some unpleasant aliens have reprogrammed it to produce a killer nerve gas to wipe out mankind. Naturally you, alone, are sent to obliterate these Hadeans and save the world.

The refinery is split into circular levels that you must orbit, zapping aliens as you go, until a dimension duct opens letting you through to the next level.

Each level consists of raised barriers and objects designed for you to crash into while being chased by missile firing aliens.

In between levels a bonus screen helps you to practice your shooting skills but it doesn't save the game from becoming yet another Uridium inspired shoot-em-up. T.H.

Touchline

Title: Erebus. **Supplier:** Virgin, 2-4 Vernon Yard, Portobello Road, London W11 2DX. **Tel:** 01 727 8070. **Machine:** C64. **Price:** £8.95.

Originality: 4/10. **Graphics:** 6/10. **Playability:** 5/10. **Value:** 6/10.



DESTROYER



Take the helm of a US Fletcher class Destroyer as well as the guns, depth charges, torpedoes, sonar, radar, navigation and damage controls stations in a Dambusters systle multi-screen game.

Thirteen stations all together must be monitored and perfected if you are to complete one of the seven scenario's in which you must escort convoys, hunt submarines, rescue pilots and run blockades.

Each station has its own controls and impressive graphics ranging from the bridges bank of controls to the blip on the sonar screen.

After a mission briefing, you're on your own. Typing in two letter commands moves you between stations where you can plot courses or set depth charge depths ready for a submarine attack.

As the action hots up you will have to assign damage control crews, fight the enemy and keep the ship off dangerous reefs.

The game plays very well and soon you'll be fighting your way through the difficulty levels earning your stripes as a Destroyer captain.

Destroyer is very similar in play and style to Microprose's chart topper Silent Service only this time you keep your head above the water. T.H.

Touchline

Title: Destroyer. **Supplier:** US Gold (Epyx), Units 2/3, Holford Way, Holford, Birmingham B6 7AX. **Price:** £9.99. **Machine:** C64.

Originality: 6/10. **Graphics:** 9/10. **Playability:** 8/10. **Value:** 9/10.

FLASH GORDON

Flash, you've only got 24 hours to save the world! The evil Emperor Ming has targeted planet killer missiles at earth and you must stop him.

Unfortunately, the only way you can do this is to kill Ming before he fires them from the controls he always carries with him.

The mission hasn't started well as your ship crashed into a jungle instead of blowing Ming's palace apart. Now you have to search out Prince Barin and win his confidence (by beating him senseless) and ride to Ming's Palace on a bike he'll give you while fighting Ming's minions.

All this must be completed within 24 hours which isn't easy as you lose valuable time whenever a jungle monkey or snake chomps you or Prince Barin defeats you.

Luckily this 24 hours doesn't include loading time as the game plays in three parts and you must complete them in order.

Yet another excellent game in Mastertronic's M.A.D. series. T.H.

Touchline

Title: Flash Gordon. **Supplier:** Mastertronic, 8-10 Paul Street, London EC2A 4JH. **Machine:** C64. **Price:** £2.99.

Originality: 8/10. **Graphics:** 8/10. **Playability:** 6/10. **Value:** 9/10.



INFODROID

Prepare for the ultimate in excitement. A game based on motorbike messengers that pick up and deliver parcels! OK, so the bikes are in fact custom built droids and it's set in the future but the action delivered by these futuristic Postman Pats is pathetic.

The transport system used by the infodroids is extremely silly and consists of causeways split into four lanes travelling in each direction. Easton lane consists of a series of platforms that travel faster the further it is from the central causeway. Down the centre of the causeway are lift entrances to the companies that you deliver to and from, garages to repair your droid and junctions to get to the 14 other causeways.

The result is that the droids must hop around these speed platforms like demented froggers until they finally find their destination. As for this game, it's going nowhere. T.H.

Touchline

Title: Infodroids. **Supplier:** Beyond, Wellington House, Upper St Martin's Lane, London WC2H 9DL. **Tel:** 01 379 7709. **Machine:** C64. **Price:** £8.95.

Originality: 6/10. **Graphics:** 5/10. **Playability:** 6/10. **Value:** 5/10.



TRIVIAL PURSUIT — YOUNG PLAYERS EDITION

This is the first of Domark's additional question packs planned for its Trivial Pursuit game.

This one's for the younger trivialists and contains two sets of questions for seven to 11 year olds and 12 years up.

The gameplay is identical to the original Genus edition except the categories have now changed to Nature, Science/Technology, Art/Culture, Good Times, Games/Hobbies and People and Places.

While playing the game you can find out such fascinating facts as that silver is used to make film, who introduced That's Life, that the Alm-Uncle is Heidi's grandfather and the colour of a cricket ball.

This edition is available in two different versions either

as a complete game or as a 3000 question expansion pack for the original game.

Obviously this one's for the youngsters and will be good training for the Genus edition but who wants to be beaten by an eight year old?

Other planned editions include the Genus II and Baby Boomer packs.

T.H.

Touchline

Title: Trivial Pursuit - Young Players Edition. **Supplier:** Domark, 204 Worple Road, London SW20 8PN. **Machine:** C64. **Price:** £14.95 (full game) £7.95 (question pack).

Originality: 1/10. **Graphics:** 6/10. **Playability:** 9/10. **Value:** 8/10.



MEDIATOR

When the Americana label was first launched, most people saw it as the label on which US Gold would dump all their games which failed the grade, thereby recouping some, if not all, of their losses. Time, however, has shown that although there have been some poor releases, on the whole, the label has maintained a very high level of quality; and with releases such as Go For Gold, the label has become a firm favourite with Commodore 64 owners.

All this said, the latest release, Mediator, may well be remembered by some of you as it was released, admittedly more than a few months ago, by English Software, a company which, in its time, has had quite a few hits. Why mediator was not a hit is a matter for conjecture, but at £2.99, it really does deserve to make the grade.

The game is set long ago, when a doomsday machine was placed in high orbit above the satellites Xylos and Pholos, with a sole role to deter further attacks of nuclear war between the empires of the galaxy. If this satellite detects undue levels of nuclear activity, it will be activated, and it will then destroy both civilisations.

As the saviour of the galaxy, it is your task to locate the legendary Good Mediator to acquire the mythical time crystal, which will then allow you to solve all the problems of your galaxy. Graphically, Mediator shows its age in more ways than one. The actual animation is very good, but the



split screen has some raster problems, and the backgrounds are less than perfect.

The music too reflects the age of the game, especially the background music which is nothing short of nauseating. The fact is that this game is not trying to be sold at full price, therefore many criticisms must be ignored, purely because the game represents such excellent value for money. If you can stand the graphics and sound, then the game is as good as many more recent full priced games, with more than enough problems to last the average arcade game fan happy for many an hour.

F.J.

Touchline

Title: Mediator. **Supplier:** US Gold, Units 2/3, Holford Way, Holford, Birmingham, B6 7AX. **Tel:** 021 356 3388. **Price:** £2.99. **Machine:** C64.

Originality: 6/10. **Playability:** 6/10. **Graphics:** 6/10. **Value:** 6/10.



DEFCON

By the year 2056 the Strategic Defence Initiative "Star Wars" system was in position and had been installed, worked and captured by aliens that turned it into a weapon

against the now peaceful Earth.

Luckily you as Nick "Daring" Diamond can still fly the only surviving anti-aircraft weapon and warp off to save the world.

Unfortunately, you only have a single firing laser and must blast away at the attacking aliens and the killer satellites over the planet rotating below.

The action is fast but also non descript as you'll soon tire of this and look to the extra options such as a twin firing laser and displaying your score on the screen! However, these are selected from a menu while the game continues so you won't live long enough to appreciate them.

Yet another game where a good idea has been let down by a poor game. **T.H.**

Touchline

Title: Defcom. **Supplier:** Quicksilver, Victory House, Leicester Place, London WC2H 7NB. **Tel:** 01 439 0666. **Machine:** C64. **Price:** £8.95.

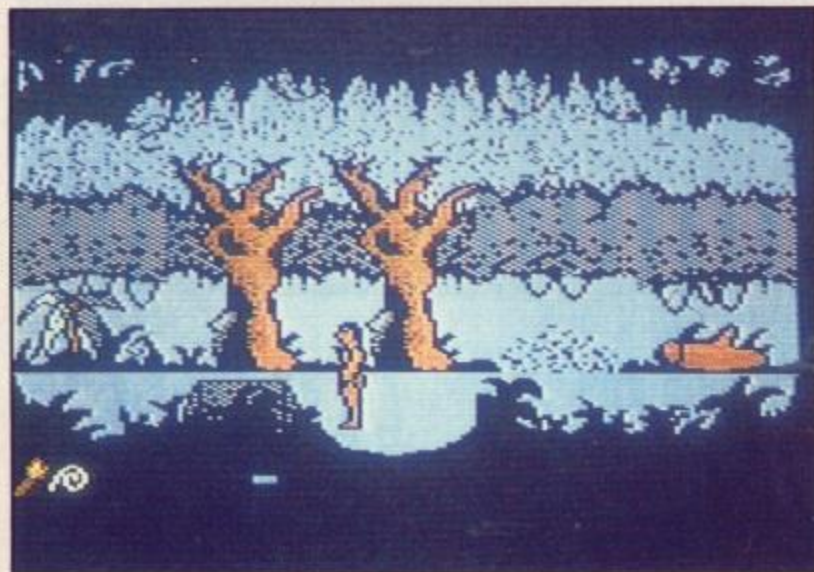
Originality: 6/10. **Graphics:** 5/10. **Playability:** 4/10. **Value:** 4/10.

TARZAN

From the western coast of the Congo, to the palm-fringed shores of Zanzibar, African folklore tells of the legendary exploits of one man, that man was Tarzan, Lord of the Apes. Left as an orphan in the jungle, Tarzan was nursed by a she-ape, Kala, and Tarzan learnt the laws and language of the jungle.

Only later in life was it discovered that Tarzan was really none other than John Clayton, Lord Greystoke. Whether or not he was a Peer of the Realm, Tarzan was still himself at heart, and whenever necessary he would don his leather loincloth and swing, Weissmuller-style through the trees.

Even as we speak, however, needs drove Tarzan to shrug off the thin veneer of civilisation and brave the perils of the jungle once again. Lady Jane Greystoke (her of "me Tarzan, you Jane" fame) has been abducted by Usanga, chief of the Wamabo, and she will meet a terrible and agonising death, unless Tarzan retrieves the seven gemstones which have been stolen from the tribal shrine.



This is the setting for Martech's latest romp, and it could be the beginning of the end for anyone who loves addictive arcade adventures with a necessity for mapping. In three computer days, you must control Tarzan until you have finally collected all seven gems, and only then will you have any chance of saving Jane.

To help Tarzan, there are various animate and inanimate objects that must be collected, including ropes, monkeys and different coloured shields. Without these items, Tarzan will never complete his mission, so a keen eye is essential.

The first thing anyone will notice upon loading the game is Rob Hubbard's incredible soundtrack which, technically, must be his most impressive to date. With only 4k free, Rob has managed to get the whole Tarzan theme, complete with incredibly authentic bongos, as well as a host of effects including a nighttime section complete with chirping crickets!

Once loaded, the quality of the graphics is also apparent. Nice backgrounds and an excellently animated Tarzan all add to the feeling of the game, although the time taken to flick-scroll the screen, and the manner in which it is done is less than impressive.

Tarzan is an excellent arcade adventure which together with games such as Antiraid, show the way for software companies to go. Even if the game was boring the Rob Hubbard music would justify the price, however it isn't, so how can you lose? **F.J.**

Touchline

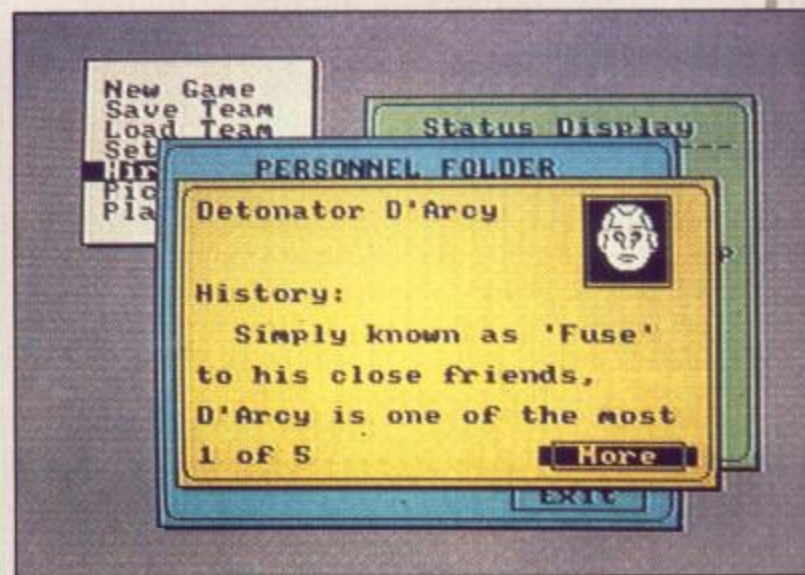
Title: Tarzan. **Supplier:** Martech, Martech House, Bay Terrace, Pevensey Bay, E Sussex. BN24 6EE. **Tel:** 0323 76616. **Machine:** C64. **Price:** £9.95.

Originality: 8/10. **Graphics:** 7/10. **Playability:** 7/10. **Value:** 8/10.

THEY STOLE A MILLION

Ever wanted to plan the perfect crime from the comfort of your living room? Now you can using the S.W.A.G. (SoftWare for Aspiring Criminals) disk available through "What Crime" magazine.

This database of hoodlums for hire, targets to be robbed



and fences to sell the goods allows you to plan and execute enough jobs for you to rise from small time crook to Mr Big.

Using window menus you can buy information and blueprints of your chosen target and select your team to do the job. Characters such as Charlie Volt and Detonator D'Arcy have specialist skills that can be hired for a fee and usually a cut of the profits so you should shop around to find the right team.

Using the blueprint and a simple set of icons you can plan every step of the raid from disabling alarms to blowing the safe.

During the raid the Boss usually is the lookout (it's safer) and must freeze the action if a police patrol comes into view.

Success will lead you on to bigger and better jobs until you tackle a top security bank as you go for the million.

T.H.

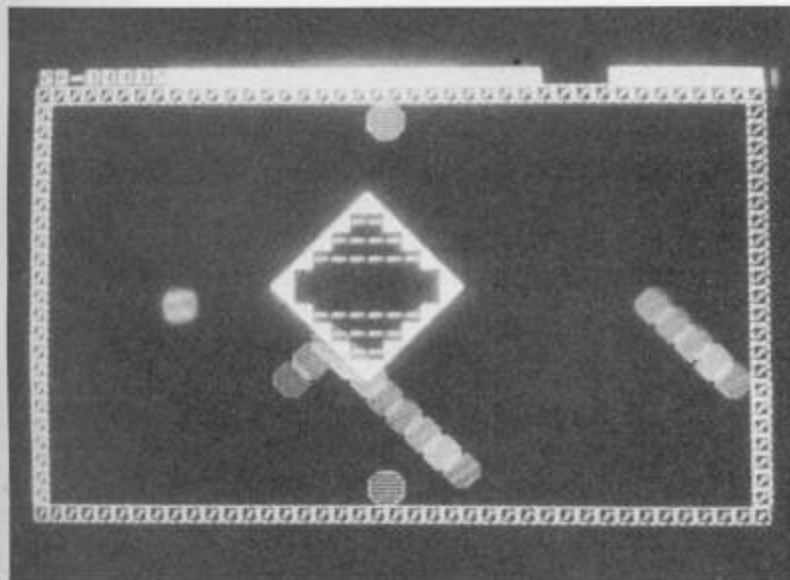
Touchline

Title: *They Stole a Million*. **Supplier:** Ariolasoft, 68 Long Acre, London WC2E 9JH. **Machine:** C64. **Price:** £9.95.

Originality: 8/10. **Graphics:** 4/10. **Playability:** 7/10. **Value:** 7/10.

STARBURST

The C16 boom seems to have slowed down slightly, and with it, the number of really good games. One of the few games that really made the best of the little Commodore's graphics and colour was an offering from Ariolasoft, called Hyperforce, and programmed by Tony Takoushi.



Therefore, when the latest Ariola/Takoushi offering was released, I was eager to get my grubby little hands on to the joystick and put it through its paces. Hmmmm, if first impressions count, then this game failed to impress me. It seemed to me that the author had tried to cover up for the games obvious roots by overcomplicating the gameplay, something that has seen many people fall flat on their faces.

Only after a few hours play did I start to find myself hooked, although why I was hooked I'm not totally sure. Starburst is basically a breakout derivative with some new touches and added gameplay. In order to keep the game interesting for more than a few minutes, there are three

different levels, all of which take some time to master.

The first level involves blasting at two balls at the top and bottom of the screen until they have been hit so many times that they become 'active'. Your ship then stops firing and turns into a large pong type bat, with which you must guide these two balls into their respective home slots. The moral of this screen is speed, as the faster it is completed, the more points are built up. If this level sounds too easy, there are some rogue balls to complicate it, and if you fail to achieve the objective before the two active guages run out, then you must start a completely new game (no lives on this level!).

If you successfully complete level one, you are thrown into a bonus level, and it is here that points come free and easy, until time runs out. Level two involves blasting through a force field, from either the bottom or the top of the screen. As the forcefield shrinks, a number of coloured balls appear, and must be avoided at all costs, and at one point it gets so bad that there are eight balls flying around at break-neck speeds! As with level one, completion leads to a bonus level, which lasts as long as the amount of gauge time you have remaining.

Level three ought to be the most difficult, but it isn't! All you need to do is round up the Plastron Boulders by shooting them. Points are flying around here, with 500 available every time you complete the game. Reminiscent in many ways of an early Minter game, Starburst, at £2.99, represents excellent value for money, and should not be missed by any C16/Plus 4 owner looking for a challenge.

F.J.

Touchline

Title: *Starburst*. **Supplier:** Ariolasoft, 68 Long Acre, Covent Garden, London WC2E 9JH. **Tel:** 01 836 3411. **Machine:** C16/Plus 4. **Price:** £2.99.

Originality: 9/10. **Graphics:** 6/10. **Playability:** 7/10. **Value:** 7/10.



CHAMPIONSHIP WRESTLING

Over the past couple of years, one company above all others has stood out when it comes to sport simulations. That company is Epyx. Once again they have proved their

worth with Championship Wrestling. In general I am not a great sports fan. However, where computers are concerned, I feel that sports programs offer a fine medium of entertainment.

Basically the objective in Championship Wrestling, is to get rid of all opposition and become the Champion wrestler. As in most Epyx games, the more people that partake in the festivities the better. On loading up you are asked if you want to either practice, compete or see world records.

Obviously, to start with you choose the practice option. This allows you to get acquainted with all the various moves and joystick positions that are required. (I would suggest you get plenty of practice before doing battle with someone else.)

In the competition mode, if you are playing alone, you select a wrestler and then play each of the seven others in turn. With more than one player, each player will be asked to choose a wrestler. The computer then organises the matches and battle begins.

When playing in competitions, judicious selection of who you want to be is crucial. Each wrestler has his own style and strong points. Also each has one specialised move that none of the others have. So once again practice is recommended to discover each wrestlers effectiveness. (This move is known as the custom move.)

Overall, there are some 30 moves possible that each wrestler can perform. Unfortunately, there is not enough space here to go into each one in detail. Basically they are in eight groups: close to opponent, far from opponent, custom move, headlock, lift, airplane spin, opponent on mat and walking around ring. The use of certain moves depends upon your previous move. For example to give your opponent an airplane spin you need to be lifting him in the air. To be able to lift him, you need to have him in a headlock. To get him into a headlock you have to be close in. It's this interaction of moves that makes the game that much more enjoyable.

There are one or two nice touches within the program. For instance, if you take your time the crowd will boo and hiss and wave banners. Throw your opponent out of the ring and the crowd go wild. All in all, this is a nicely presented game that with practice is quite playable and fun.

Touchline

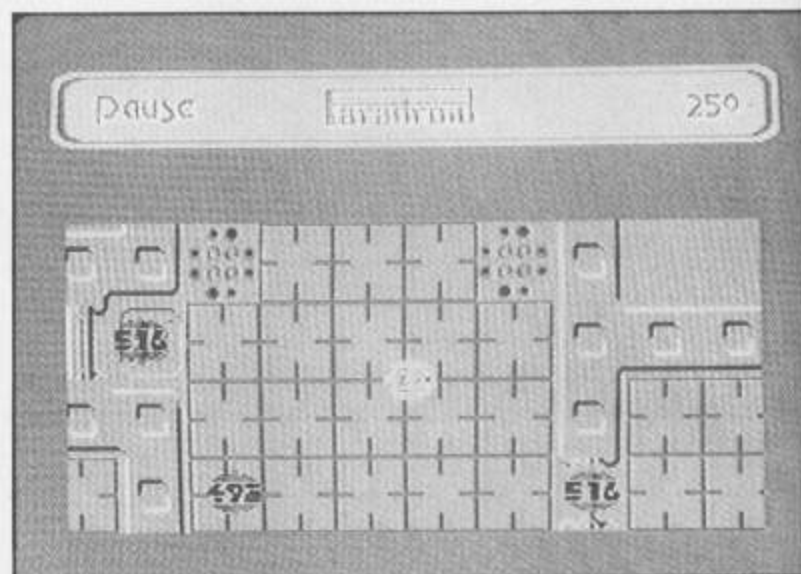
Title: Championship Wrestling. **Supplier:** US Gold, Units 2/3 Holford Way, Holford, Birmingham, B6 7AX. **Price:** £9.95. **Originality:** 7/10. **Graphics:** 7/10. **Playability:** 8/10. **Value:** 8/10.

PARADROID

For those of you that missed them first time round, Hewson has re-released two very popular '86 hits. Paradroid and Uridium, both programmed by Andy Braybrook. Paradroid is the same as before, except that it is much faster, whilst Uridium has lots of new ship designs. So what do you have to do?

Paradroid is simple, you are ordered to destroy a mutinous crew of Droids that have taken over a galactic freighter. To aid you in your task, you are issued with a 'Droid Influence' device. With this device you can take over and control Droids. (You can also simply blast them out of

their existence). The droids are scattered around the ship, which is made up of several decks. Obviously, things are not that easy. The droids are made up of varying power



strengths. The higher the droid number the better it is. Once you destroy all droids on one deck, the deck computer shuts down, and therefore all lights go out. In other words the deck goes dark. One word of caution here. Do not think that it is simply a matter of blasting everything in sight on each level. There is a lot more strategy involved. My only real tip for you is proceed slowly.

Next question is, what weaponry have I? The influence device is fitted with low power twin lasers. The droids also have twin low power lasers. However as the droid number becomes higher, then its firepower increases. Two types of battle droids have disrupters, these you have to take over, you cannot shoot them. Transferring to droid is quite involved, but most of the strategy is applied to this part of the game. Decide which droid you wish to take over, stop and centre the joystick. Press the fire button and hold it down, then ram the chosen droid. The screen will now change to what resembles a circuit diagram. The idea being to control the rectangular blocks by having your colour represented inside the block. You gain control of a block by moving your pulsars up or down, then pressing the fire button at the required place. If after the time limit you have more of the blocks coloured in your colour transfer is complete. The higher the droid number, the more pulsars are made available to it.

To move around the different decks, find one of the lifts and press the button whilst you are standing on it. You may view decks, the whole ship, or droid capabilities by standing in front of one of the deck consoles that are scattered around.

I fairly enjoyed Paradroid the first time, but now that it has been made slightly faster in play, it becomes even more enjoyable.

Touchline

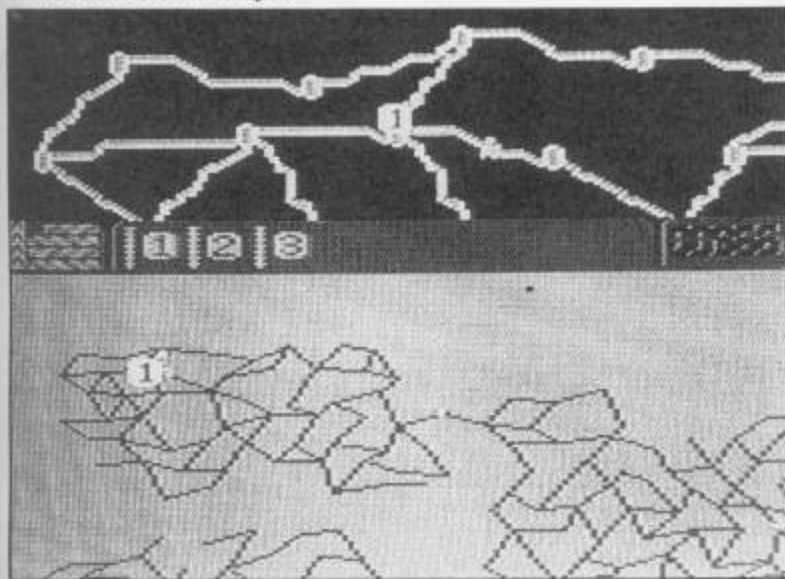
Title: Paradroid. **Supplier:** Hewson, Hewson House, 56B Milton Trading Estate, Milton, Abingdon, Oxon. OX14 4RX. **Machine:** C64. **Price:** £9.95 with Uridium. **Originality:** 8/10. **Graphics:** 8/10. **Playability:** 9/10. **Value:** 9/10.

TRACKER

As Chandos, leader of an unscrupulous group of space pirates and mercenaries, you have been given a tough assignment. The centrepiece complex on the planet of Zeugma IV has gone berserk. The computer that controls all facets of life on this plant of pleasure, has decided that it no longer needs human controllers. No problem, just switch it off! Wrong. This computer has a few tricks up its sleeve — if computers have sleeves — to stop you pulling the plug.

Not least of these are the Cycloid patrol craft, over which it has total control. These craft patrol the trackways that surround the computer complex, destroying anything in their path. This can be a problem if you are on the trackway at the time. Therefore, to aid you in your mission, you have been equipped with the best ships that Caliban can provide. To reach the computer centre it is necessary for you, along with a maximum of seven other ships, to traverse the trackways knocking out communication centres and the cycloids.

Your ships are equipped with ion bombs, and forward firing lasers to accomplish this task. The bombs have very short fuses, so do not hang about too long. The C.P. complex consists of 22 interconnecting sectors, each with its own communication centre. You are initially beamed down to three 'Safe Sectors', and can on knocking out a centre, beam down additional ships.



The game itself is displayed in three sections. At the top of the screen is a scrolling map centred on the current ship being controlled. Any enemy forces are also displayed on this screen. Half way down the screen is the status window. Shown here are the current conditions of all eight ships. Also shown are shield status and whether they are under attack or not. On the left of this window, is a more informative display of your current ship in use. Along with this, there is an audience rating, a sort of score which continuously counts down. The better you do, the more points you clock up. Beneath this is where most of the action takes place.

This screen has two functions. Firstly, it displays one of four maps, of varying scales. These are selected via the function keys. Alternatively, a 3D view through the cockpit can be called up. This is where all combat takes place. This screen is used when dropping bombs on Comms centres, and when destroying the computer itself.

This game comes well packaged, with a short novelette, to get you into the right mood. It is a good attempt at an

original game. The game itself is a very cunning and strategically orientated game, with undertones of the Star Wars trench sequences. At £17.95 this may be a little pricey for some people, but if you can afford it, you could do a lot worse than purchase this program.

Touchline

Title: Tracker. **Supplier:** Rainbird Software, Wellington House, Upper Street, Martins Lane, London WC2H 9DL. **Price:** £17.95. **Machine:** C64.

Originality: 8/10. **Graphics:** 8/10. **Playability:** 9/10. **Value:** 7/10.

URIDIUM

The second of Hewson's re-releases is Uridium. Fans of the game will only need to be told that this is the same as before but with some new superb ships. For those of you that are new to this game let me expand.

The solar system is under attack from metal seeking ships, known as Super-dreadnoughts. These ships seek out and drain precious metal ores from the planets within your sector. Your task is to destroy the dreadnoughts before they exhaust all the different ores. Firstly, you must destroy its defences both on the surface of the ship, and those that fly around in attack groups. Control is by the joystick and is as follows. Up and down control your height above the ships surface. Left and right control your direction. Avoid structures on the ships surface that cast shadows, this means that they are high up. The dreadnoughts fighter defences deploy in waves, so be prepared for some nifty flying.

On the ship, the small coloured squares that flash, are silos for the homing mines. These can be fairly easily avoided if they appear singly. Destroy as many of the surface defences as you can, whilst avoiding the fighters. Keep flying right, and be on the look out for a landing strip. Once the 'LAND NOW' signal is seen, land your craft as quickly as possible. The surface fighters become very intelligent at this point.

On safely landing, you are then presented with the bonus screen. It is up to you to gain as many points as possible, before flying over the dreadnought for the final strafe run. I have to be honest, and say that normally, I am not into shoot and blast em type of games. My forte being text only Infocom. However, when Uridium first came out, I must confess I could not stop playing it. There is something about this program that puts it in the same class as Boulderdash 1, 2 and 3. I am pleased to say that this re-release lives up to its predecessor. The new dreadnought designs are done really well. And quite a few of them will have you pulling your hair out. The designs are in the same Bas relief as before, with one or two extra characters re-defined.

Touchline

Title: Uridium. **Supplier:** Hewson, Hewson House, 56b Milton Trading Estate, Milton, Abingdon, Oxon OX14 4RX. **Machine:** C64. **Price:** £9.95 with Paradroid.

Originality: 7/10. **Graphics:** 8/10. **Playability:** 9/10. **Value:** 9/10.

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Nine Line Matrix

This C128 utility will make your 80 column display a lot clearer and it's short and easy to use.

By A. Millett

Quite a while back, Commodore brought out the 4000 series Pets. Like their predecessors and the subsequent Commodore range, they suffered from ROMs (called 'Basic 4.0') that were incompatible with all the other Commodores. This caused many programmers like myself the unnecessary pain of wading through and modifying our programs, and many others the bigger pain of having to lash out large amounts for new Basic 4.0 compatible goodies (that, I believe, was the point of the exercise).

That aside, one nice little feature this machine possessed was a vertically-spaced mode, with an extra raster line between each line of text on the screen. This routine will allow C128 users to do this in 80 column mode!

Operation

Operating the program is pretty self-explanator. Just load and run it, use cursor up and down to centralise the screen, and hit RETURN. You can now continue to use the 80 column screen as normal with other column programs, and the screen will remain in vertically-spaced mode until the machine is switched off.

Note that I have used high line-numbers so that you may incorporate the program into your own programs. To do so, change the END statement in line 39590 to RETURN and call the routine at the beginning of your own

program with GOSUB 39000.

If you are interested with experimenting with the 80 column chip, you will find the SYS's I have used very interesting. Even though the SYS REED command (yes, that's REED!) is unused in this particular program, I

have left the variable and some REM's in so that you may experiment with reading the 80 column registers.

I hope you find this routine as useful as I have. The tops of those 't's don't touch the bottom of those 'y's any more!

PROGRAM: 9 LINE MATRIX

```

39000 REM" 9 BY 8 MATRIX FOR
80 COLUMNS ON THE C128
39020 REM"          BY [s ADD]
RIAN [s MJILLET]
39040 REM
39060 :
39070 BANK 15
39080 WRITE=52684:REM" [s UJS]
E SYS WRITE,DATA,REG TO SE
T 80 COLUMN CHIP REGIS
TER -
39090 REED=52698 :REM" [s UJS]
E SYS REED,0,REG:RREG DATA
TO READ REGISTER.
39095 :          :REM" YES,
THAT WAS REED, NOT READ!
39100 SYS WRITE,8,9 :REM" [s
R]ASTER LINES PER CHARACTER
39120 SYS WRITE,25,6:REM" [s
N]O. OF LINES DISPLAYED
39140 SYS WRITE,7,23:REM" [s
N]O. OF RASTER LINES IN CHAR.
DISPLAYED.
39160 SYS WRITE,35,4:REM" [s
A]BSOLUTE NO. OF LINES.
39180 SYS WRITE,30,7:REM" [s
V]ERTICAL POSITION OF TOP OF
SCREEN.
39200 :
39210 SYS 27500,,0:SYS 27500,
,S:REM" [s E]QUIVALENT OF GRA
PHIC 0:GRAPHIC 5
39215 : REM" [s S]PECIAL M
ETHOD FOR BASIC-128 COMPILER:
- USES 8K LESS MEMORY!
39220 PRINT CHR$(142);"[CLEAR
][s O]";SPC(77);"[s P]";
39240 CHAR 1,0,24,"[s L]"
39260 CHAR 1,70,24,"[s @]":RE
M" [s S]HIFT-@ CHARACTER
39280 CHAR 1,22,9,""
39300 PRINT CHR$(14);"[s U]SE
CURSOR UP/DOWN TO MOVE DISPL
AY,
39330 PRINT SPC(27);"[DOWN][D
OWN][s H]IT [s R][s E][s T][s
U][s R][s N] WHEN REA
DY."
39340 KUP=30
39350 SYS WRITE,KUP,7:REM" [s
V]ERTICAL POSITION OF TOP OF
SCREEN.
39360 DO:GET KAS
39380 LOOP UNTIL INSTR("DOWN
][UP]" + CHR$(13),KAS)
39400 IF KAS="][UP]" THEN KUP=
KUP+1:GOTO 39350
39420 IF KAS="][DOWN]" THEN KU
P=KUP-1:GOTO 39350
39500 PRINT"[CLEAR]";
39590 END:REM" [s U]SE RETURN
IF SUBROUTINE
39599 :

```




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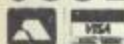
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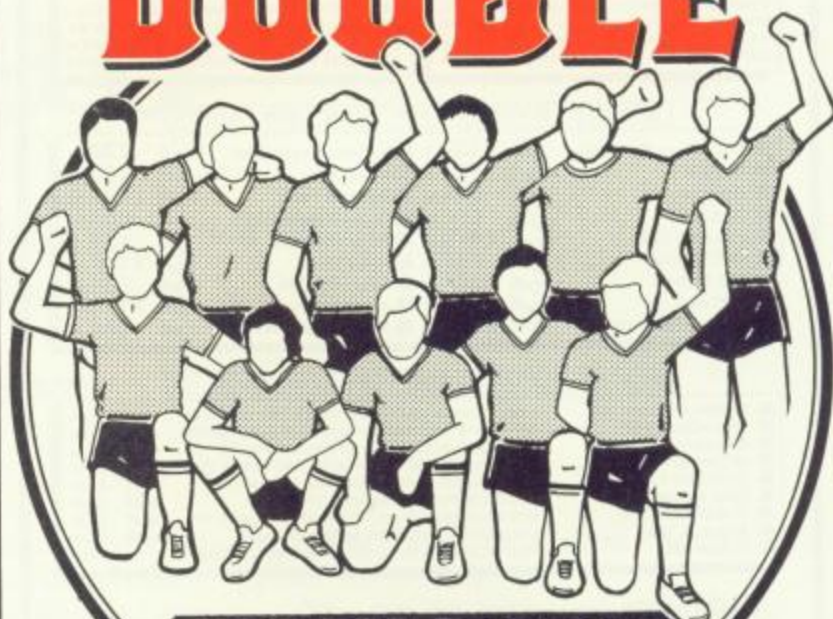
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Joystick Read

Here's a time saving and invaluable joystick routine for Basic programmers in league with a C64.

By Nick Sumner

How many sleepless nights have you spent wishing that there was an easier way to read the Commodore's joystick ports through Basic. One that was much faster and easier to understand. Well, funnily enough, here is that routine! Read on to find out more.

subroutine, BUT, they must be in that order, and before any other variables.

Next, do not call the routine twice within your program or the computer may crash or BASIC may be corrupted!

For all m/c enthusiasts, there is a disassembly included. The interrupt routine shown can be used for smooth

scrolling, more than eight sprites or other raster tricks.

The test program included allows you to move a white block around the screen with the joystick, and the fire button will make the border colour change (well, it's only a demo!).

I hope you enjoy using this routine in your own programs.

In Use

This Joystick utility has been designed to help those who are Basic programmers, but who want to add that professional touch to there programs. Using this routine for a joystick in Port 2 could just do that!

The actual routine is on an interrupt and so doesn't waste Basic's time for GOSUBS etc.

Two Basic string variables are used to store the joystick information, so no PEEKing is needed either!

However there are a few things that you will need to know before you can run the routine, so read on!

Because the routine uses two string variables, these need to be set up by the programmer, before any other variables are defined or the machine code routine is called. This is what to do!

In your program:

```
10 JO$="" :FIRE$="OFF":SYS 52736
```

JO\$ and FIRE\$ must be set like this either at the first line or in a

JOYSTICK ROUTINE DISASSEMBLY

```

1 AGENDA      = $CFFF
2 COUNT1      = $CFFE
99 *=$CE00
1000          SETI                ! SET INTERRUPT DISABLE STATUS
1010          LDA #$00            ! CLEAR CIA CONTROL REGISTER A
1020          STA $DC0E
1030          LDA #$1B
1040          STA $D011            ! CLEAR MSB FOR RASTER
1041          LDA #$80
1042          STA $D012            ! SET RASTER POSITION
1050          LDA #CRT
1055          STA $0314            ! CHANGE JUMP LOCATION
1060          LDA #DRT
1070          STA $0315
1300          LDA #$01
1320          STA $D01A            ! SET FOR IRQ COMPARE
1321          LDY #$03            ! FIND JO$ CO-ORDINATES
1322          LDA ($2D),Y
1324          STA $FB
1326          INY
1328          LDA ($2D),Y
1330          STA $FC
1332          LDY #$0A            ! FIND FIRE$ CO-ORDINATES
1334          LDA ($2D),Y
1336          STA $FD
1338          INY
1340          LDA ($2D),Y
1342          STA $FE
1350          LDA #$55            ! PLACE ASCII 'U' INTO MEMORY
1352          STA $CF10
1354          LDA #$44            ! PLACE ASCII 'D' INTO MEMORY
1356          STA $CF11
1358          LDA #$4C            ! PLACE ASCII 'L' INTO MEMORY
1360          STA $CF12

```




```

1362 LDA #$52      ! PLACE ASCII 'R' INTO MEMORY
1364 STA $CF13
1480 CLI          ! CLEAR INTERRUPT DISABLE STATUS
1490 RTS          ! RETURN TO BASIC
1500 RT LDA #$01   ! CHECK FOR INTERRUPT OCCURRING
1505 BIT $D019
1510 BNE BEGIN
1512 JMP $EA31     ! JUMP TO SYSTEM ROUTINES
1515 BEGIN LDA #$01 ! SET REGISTERS FOR WORK
1519 LDY #$00
1520 STA COUNT1
1521 LDX #$00
1523 LDA #$20
1524 STA ($FB),Y   ! CLEAR JO$
1525 LOOP1 LDA $DC00 ! READ JOYSTICK
1530 AND COUNT1   ! GET ONE DIRECTION
1535 BNE NEXT     ! IF NOT USED GO ON
1540 LDA $CF10,X   ! GET ASCII VALUE
1545 STA ($FB),Y   ! STORE IN JO$
1550 JMP FIRE     ! GOTO FIRE BUTTON CHECK
1555 NEXT ASL COUNT1 ! DOUBLE COUNT1
1570 INX
1575 CPX #$04     ! ALL DIRECTIONS CHECKED?
1580 BNE LOOP1
1581 FIRE LDY #$09 ! SET FIRE$ TO 'OFF'
1582 LDA #$03     ! (SET STRING LENGTH TO 3)
1583 STA ($2D),Y
1584 LDY #$01
1588 LDA #$46
1589 STA ($FD),Y
1590 INY
1591 STA ($FD),Y
1592 LDA $DC00     ! READ JOYSTICK
1593 AND #$10      ! GET FIRE BUTTON
1594 BNE STOP      ! IF NOT PRESSED THE GOTO STOP
1595 LDY #$09      ! CHANGE FIRE$ TO 'ON'
1596 LDA #$02     ! (CHANGE LENGTH OF FIRE$ TO 2)
1597 STA ($2D),Y
1598 LDY #$01
1599 LDA #$4E
1600 STA ($FD),Y
1612 STOP LDA #$80 ! SET NEW RASTER POSITION
1613 STA $D012
1614 LDA #$1B
1615 STA $D011
1616 LDA #$01     * ! RESET INTERRUPT FLAG
1617 STA $D019
1620 JMP $EA31     ! JUMP TO SYSTEM ROUTINES

```

PROGRAM: JOYSTICK ROUTINE LOADER

```

10 10 REM *****
84 15 REM *
39 20 REM * JOYSTICK ROUTINE *
C6 25 REM *
03 30 REM * BY NICK SUMNER *
50 35 REM *
22 40 REM * 30/8/86 *
52 45 REM *
95 50 REM *****
76 100 POKE$3281,0:PRINTCHR$(147)
)CHR$(5)"[SPC7]**** JOYSTICK
ROUTINE *****"
53 110 PRINT:PRINT"LOADING IN DA
IA NOW..."
SC 250 MC=$2736:RL=0:LN=500
28 260 SC=0:FORI=0TO7:READD
91 270 IFD<0GOTO340
D8 280 IFD>255GOTO330
C0 290 POKEMC+RL,D:SC=SC+D:RL=RL
+1:NEXTI
FA 300 READD:IFD<0THEN340
38 310 IFSC=0THENLN=LN+10:GOTO26
0
0A 320 PRINT:PRINT"?SUMCHECK ";
32 330 PRINT"ERROR IN LINE";LN:E
ND
DB 340 READD:IFSC<>0GOTO320
41 350 PRINT:PRINTSPC(8)"LOADED"
83 360 PRINT:PRINT"TO USE:"
85 370 PRINT:PRINT"SYS 52736"
0C 375 PRINT"DON'T FORGET TO DEF
INE 'JO$' AND 'FIRES' BEFORE A
NY OTHER VARIABLES."
2A 380 PRINT:PRINT"WHEN USING JO
$: "
68 382 PRINT"U-UP, D-DOWN, L-LEF
T, R-RIGHT."
93 384 PRINT:PRINT"WHEN USING FI
RES: "
60 386 PRINT"ON-FIRE ON, OFF-FIR
E OFF."
3B 388 PRINT:PRINT"HIT ANY KEY T
O CONTINUE."
C7 390 POKE198,0:WAIT198,1
E8 392 PRINTCHR$(154)CHR$(147):P
OKE$3281,6
0C 395 END
45 500 DATA 120,169,0,141,14,220
,169,27,860
DC 510 DATA 141,17,208,169,128,1
41,18,208,1030
53 520 DATA 169,75,141,20,3,169,
206,141,924
69 530 DATA 21,3,169,1,141,26,20

```

```

8,160,729
B2 540 DATA 3,177,45,133,251,208
,177,45,1031
3F 550 DATA 133,252,160,10,177,4
5,133,253,1163
93 560 DATA 200,177,45,133,254,1
69,85,141,1204
9A 570 DATA 16,207,169,68,141,17
,207,169,994
3E 580 DATA 76,141,18,207,169,82
,141,19,853
B2 590 DATA 207,88,96,169,1,44,2
5,208,838
FC 600 DATA 208,3,76,49,234,169,
1,160,900
B9 610 DATA 0,141,254,207,162,0,
169,32,965
BE 620 DATA 145,251,173,0,220,45
,254,207,1295
A2 630 DATA 208,8,189,16,207,145
,251,76,1100
92 640 DATA 122,206,14,254,207,2
32,224,4,1263
7F 650 DATA 208,232,160,9,169,3,
145,45,971
E9 660 DATA 160,1,169,70,145,253
,200,145,1143
73 670 DATA 253,173,0,220,41,16,
208,12,923
C8 680 DATA 160,9,169,2,145,45,1
60,1,691
93 690 DATA 169,78,145,253,169,1
28,141,18,1101
BA 700 DATA 208,169,27,141,17,20
8,169,1,940
66 710 DATA 141,25,208,76,49,23
4,-1,733

```

PROGRAM: TEST ROUTINE

```

8E 1 REM
7B 2 REM *** JOYSTICK TEST. ***
8C 3 REM
79 4 REM *** BY NICK SUMNER ***
8A 5 REM
0C 6 REM *** 30/8/86 ***
88 7 REM
91 10 JO$=" ":FIRES="OFF":SYS527
36
84 11 REM
42 12 REM *** SET JO$ & FIRES F
RST ***
82 13 REM
35 20 A=0:B=0:X=0:Y=0:Z=0:PRINTC
HR$(147)
91 30 IFJO$="U"ANDY>0THENY=Y+1:G
OSUB100
47 40 IFJO$="D"ANDY<24THENY=Y+1:
GOSUB100
37 50 IFJO$="L"ANDX>0THENX=X+1:G
OSUB100
02 60 IFJO$="R"ANDX<39THENX=X+1:
GOSUB100
3A 70 IFFIRES="ON"THENGOSUB200
3C 80 GOTO30
EB 100 REM
07 110 REM *** MOVE BLOCK ***
F7 120 REM
40 130 POKE$5296+A+B*40,14
B2 140 POKE1024+X+Y*40,160
0E 150 POKE$5296+X+Y*40,1
A0 160 A=X:B=Y
24 170 RETURN
47 200 REM
97 210 REM *** CHANGE BORDER ***
53 220 REM
EF 230 Z=Z+1
89 240 Z=ZAND255
61 250 POKE$3280,Z
8B 260 RETURN

```


Hard Copy

One of the biggest investments which a computer user makes is inevitably a printer. For this reason we've put a new Citizen model through its paces.

By Mycroft Appleby

The Citizen *LSP-10* printer is one of the low end price bracket printers that is making Citizen a very big name in the peripherals world at the moment.

It's easy to see why Citizen has come so far so fast. The *LSP-10* is a full width printer with all the facilities found on the more expensive Epsoms along with NLQ and tractor/friction feed options. Externally, the machine is a lot smaller than its immediate opposition, its dimensions being 385mm wide, 255mm deep, and 90mm high. The control buttons comprise the usual on/off line, line feed, and form feed. With indicators for power, paper out, and ready. The current trend towards setting the print options (ie. bold, italics, NLQ etc.) from the front panel is not supported here, which is a shame - but this is a low cost printer.

Paper and Print

The paper advance knob is well mounted on the right of the machine immediately above the interface connector. Having the interface on the side of a printer is most unusual as most printers have them on the back. But when you think about it, the side is a most logical place to attach cables as they then don't foul the paper feed. The power cable does attach at the back, but it at one corner and has a 90 degree bend on it to make the cable emerge sideways.

The printer comes as standard with friction feed, but a tractor option is available. This feeds the paper in very easily and is one of the most trouble free paper feeds that I have come across. The friction feed can also be supplemented by a sheet feeder that can feed correspondence quality paper to compliment the NLQ print. Paper loading is trouble free to an extent that I hadn't thought existed after using the Epson method of loading paper. When there is no paper in the machine, the

form feed button doubles as an auto paper load button that takes the paper from the back of the machine to in front of the print head.

Print speed varies between 24 characters per second in NLQ mode and 120 cps when printing draft. The draft output isn't bad, but obviously isn't as good as you would expect for a printer whose main selling point is that ability. With the *LSP-10* it is more of a bonus. The NLQ in this case should be considered as just an easier to read matrix font, you wouldn't write a letter to your bank manager with it.

Interfacing

As is becoming common nowadays the interface is on a cartridge. The one I had was a centronics parallel type, but I believe a Commodore serial one is available. The cartridge is flush fitting and is shaped in the same way as the bottom of the case. Unless you know that it is there, you wouldn't ever suspect it. A well thought out point with the cartridge is that the dip switches are on it. These are the switches that set up the different start up options and functions on the printer. Usually you have to scrape around the inside of the printer or even open up the case with a screwdriver. But with the *LSP-10* you can remove the cigarette packet sized unit and have it in front of you whilst you consult the manual.

The dip switches in this printer are more important than in most as they set the emulation mode of the machine. The printer is capable of emulating the popular (i.e. around 60% of the market) Epson range of printers to a greater or lesser degree. This means that if you ever have screen-dump software for example, you may find that it has an Epson option on it. One of the three Citizen

emulation modes should suffice. It can also emulate the less popular, but business standard, IBM graphics printer. But as you don't often find these on Commodores, you probably won't ever need it.

Documentation

The manual is a sturdy tome, in a spiral binding that lays flat (very useful). The concept and features of the printer are introduced in a logical manner with worked examples, sample outputs, and diagrams. At the end of the manual there is a tear off card with all the more common escape codes indicated. This saves a lot of time as I usually have to dredge through the manual, making it extremely dog-eared, to extract the relevant information.

All the escape codes and functions are based around the common Epson standard with the usual bold, double strike, compressed, expanded, italic, or correspondence quality styles supported. The graphics capability is also good with three graphics densities up to around 1920 dots on an eight inch line. There is also two speeds for the medium density print to improve quality at the cost of reducing speed. You can also define your own characters on the 11x9 print format if you discard the 2K printer buffer.

Verdict

Overall I can safely say that having used the printer on regular basis for the last month, that I am extremely happy with it. It provides most of the facilities of the most popular printer in the world, with none of the little idiosyncrasies that get the name of Epson cursed over, and at a much more reasonable price. Definitely the top of my list for printers at the moment. VC

COMMODORE plus-4/C16

PHOTON LOAD — FAST LOAD AND SAVE

Have you ever wasted time waiting for your programs to load or save? This excellent program will make a real difference to your computer. PHOTON LOAD, the new cassette operating system loads in seconds and allows you to load and save your programs at about TEN times the speed of a normal load or save. Two additional Basic commands make this extremely easy to use. Why spend money on a disc drive when you can load and save this fast. Features such as striped screen loading and an audio warning when loading is complete assure you loading/saving is going to plan (unlike the Commodore system). — A well designed Cassette loading and saving system — once you have one you won't want to be without one. *Great value £7.95.*

SUPER SPRITE

This extremely clever utility allows you to use 8 sprites simultaneously over a low-resolution screen. With this program you can now imitate the sprites found on the Commodore 64! Each sprite is composed of 16 x 16 pixels for high definition. Sprites can be independently moved in any direction with VERY SMOOTH scrolling. Sprites may take on any colour and travel at any speed. Sprite priorities and collision detection are provided. Despite adding all these complex features to your computer it is very easy to use. We provide extra Basic commands to make it very easy to use sprites with your programs. On top of all this we provide you with FREE demo programs and a FREE sprite designer. What more do you need to bring real power to your games on your C16/PLUS 4. This entire package is a must for games programmers. *Excellent value — Cassette £7.95 Disc £9.95*

ELECTRIK PENCIL!!!

A truly excellent high resolution art program. Magnificent masterpieces can be quickly drawn using the powerful facilities provided by this package. The program is entirely written in high speed machine code and includes Variable pencil size, Variable drawing speed, Easy select cursor menu, pixel draw/plot, freehand, lines, circles, flood, characters/letters plotted on high-res screen at any position, 121 colours all usable simultaneously, hard copy to printer, load and save of pictures to cassette or disc, joystick or keyboard operation. Many other facilities too numerous to mention. Complete with instructions. Bring some colour into your life with ELECTRIK PENCIL. Impressive results in no time at all. Amaze your friends! *Cassette only £7.95 Disc only £9.95*

THE MIRROR - TAPE BACK UP

Superb tape to tape back up copier catering for the majority of PLUS-4/C16 games. Backs up both standard and FAST loading software. All major loading systems catered for. Very large menu of both general back up routines and popular games. Basic, machine code and protected games all easily handled. NO extra hardware and NO second cassette. Very popular utility. *Excellent value £7.95*

THE WAND — TAPE TO DISC

Make full use of your disc drive by effortlessly converting your games/software to disc. Convenient and fast loading from disc. Handles all major loading systems with a very large menu of general back up routines and games. We have had many letters telling us how much people appreciate this utility. Don't be left out — buy one! Every disc user should have one. *Excellent value — supplied on disc — £12.95*

MERLIN ASSEMBLER

100 o/o machine code assembler for the plus-4/C16. Very fast assembly of source code. Easy entry/editing of code via the full screen editor. Full error messages pinpointing the errors. Full load/save and printer facilities. Intelligent assembly. Variable names, labels, hex/decimal, text and data statements, remarks, post indexing of variables etc. Many other facilities too numerous to mention. Highly recommended — A truly superb assembler. Comes with instruction booklet and FREE booklet of machine code routines. *Cassette £8.95 Disc £13.95*

BLACK CAT — CASSETTE CONVERTER

Have you ever wanted to use your PLUS-4 Wordprocessor, Spreadsheet, Business graphics etc. With a cassette unit? This program allows you to save your files to cassette rather than disc (as forced to by Commodore). Quick, convenient, easy to use. *Only £4.95*

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- 1) Incredible value — Brand new Quickshot II Joysticks at only £5.95 plus £1.00 for P & P. Features include — "Autofire" Thumb and trigger finger fire buttons, "Built in suction cups", "New improved design" — The best selling joystick in the world.
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- 3) If you already have a joystick we can sell you Joystick adaptors at only £2.95.

CASSETTE INTERFACES

If you have a Commodore 64 cassette unit which you would like to use with your C16/PLUS 4 then you need one of these. This adaptor lead is simple to use. Just plug in and go! — A sound investment £5.95

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The perfect cure of the majority of loading problems. Specification as for the Commodore 64 (see below). *Only £6.95*

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ACCESS/VISA NO

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ADDRESS

SIGNATURE

DATE

PLEASE ALLOW UP TO 28 DAYS FOR DELIVERY YC

Labeller 64

Let your C64 take the hassle out of printing name and address labels. Your C64, a printer, some address labels and this program are all that you need.

By A.J. Lenton

How often have you had to type the address of a friend on to an envelope? Or perhaps you have a list of people that you need to send letters to quite often. *Labeller 64* will take the hassle out of this by keeping a record of the names and addresses that you use most

often and printing a selection of them out at your command.

This is the second part of the *Labeller 64* program which was started in the February 1987 issue of *Your Commodore*.

To enter this section of the program you should **LOAD** in the data you already have into the *Hex Data Entry* program and use the 'Enter Data' option to continue.

YC

PROGRAM: LABELLER

```
41E1 45 4E 20 4F 52 20 07 F1 :70
41E9 D0 52 49 4E 54 45 52 20 :EF
41F1 28 D3 2F D0 29 D0 EC DC :8C
41F9 61 46 01 50 01 9C F5 46 :88
4201 01 53 01 9C F7 8D 04 04 :27
4209 D1 0A 5A 46 01 53 01 9D :F9
4211 04 04 D1 7D 58 46 01 93 :4E
4219 D0 46 1A C5 4E 54 45 52 :C7
4221 20 C4 45 56 49 43 45 20 :D1
4229 CE 55 4D 42 45 52 20 03 :CC
4231 F1 34 9D 03 F1 D0 B3 D7 :9E
4239 FF 26 FD 26 C5 FF 12 9E :53
4241 FE 12 8C F5 52 09 FE 12 :2C
4249 8B F7 8F D4 16 52 17 EA :09
4251 46 07 91 20 06 F1 D0 EC :AB
4259 46 01 91 D0 D1 2C 5A 46 :56
4261 1F 11 C5 4E 54 45 52 20 :A8
4269 D3 45 43 4F 4E 44 41 52 :3F
4271 59 20 C1 44 44 52 45 53 :17
4279 53 20 03 F1 37 9D 03 F1 :36
4281 D0 B3 D7 FF 27 FD 27 C5 :21
4289 FF 13 9E FE 13 8C F5 52 :69
4291 09 FE 13 8B F7 8F D4 14 :93
4299 52 1B EA 46 09 91 20 06 :99
42A1 F1 91 91 D0 EC D1 75 5A :2B
42A9 46 0C 11 C4 4F 20 59 4F :7B
42B1 55 20 57 41 4E 54 D0 EC :DC
42B9 46 0E 11 12 1F CD 92 1E :EC
42C1 41 4E 55 41 4C 20 4F 52 :95
42C9 D0 EC 46 15 11 1F 12 C1 :2B
42D1 92 1E 55 54 4F 20 50 41 :70
42D9 50 45 52 20 46 45 45 44 :27
42E1 20 D0 EC 46 12 11 C5 4E :0F
42E9 54 45 52 20 27 C0 27 20 :DE
42F1 4F 52 20 27 C1 27 20 D0 :EE
42F9 EC DC FF 14 46 01 4D FE :58
4301 14 9C F5 46 01 41 FE 14 :60
4309 9C F7 8D D4 04 D1 12 5B :D9
```

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4311 46 21 1F 11 CE 55 4D 42 :68
4319 45 52 20 4F 46 20 4C 49 :17
4321 4E 45 53 20 54 4F 20 42 :DF
4329 45 20 50 52 49 4E 54 45 :9A
4331 44 20 20 D0 28 CF EC 52 :FA
4339 1E EA 46 01 91 D0 B3 D7 :52
4341 FF 28 FD 28 C5 FF 15 8A :DC
4349 FE 15 8C F5 28 FE 15 8B :8F
4351 F7 8F D4 15 52 20 EA 46 :25
4359 0A 91 20 07 F1 91 91 D0 :92
4361 EC D1 29 5B 46 00 7A 46 :B9
4369 38 11 C1 52 45 20 59 4F :4D
4371 55 20 55 53 49 4E 47 20 :82
4379 12 1F D3 92 1E 49 4E 47 :2F
4381 4C 45 20 4F 52 20 1F 12 :B5
4389 C4 92 1E 4F 55 42 4C 45 :77
4391 20 50 41 50 45 52 20 04 :98
4399 F1 28 D3 2F C4 29 20 3F :B0
43A1 D0 EC DC 7A 46 01 53 1A :3D
43A9 9C F5 46 01 44 1A 9C F7 :F0
43B1 8D D4 04 D1 C0 5B 46 01 :09
43B9 53 1A 9D D4 04 D1 2B 5C :6D
43C1 46 24 11 CE 55 4D 42 45 :26
43C9 52 20 4F 46 20 C3 48 41 :91
43D1 52 41 43 54 45 52 53 20 :47
43D9 C2 45 54 57 45 45 4E 20 :95
43E1 CC 41 42 45 4C 53 D0 EC :86
43E9 46 01 11 D0 B3 D7 FF 04 :45
43F1 FD 04 C5 FF 02 9E FE 02 :00
43F9 8C D4 13 46 0B 91 20 0B :3A
4401 F1 91 91 D0 EC D1 06 5C :92
4409 46 1F 11 CE 55 4D 42 45 :64
4411 52 20 4F 46 20 C4 49 4E :7E
4419 45 53 20 C2 45 54 57 45 :45
4421 45 4E 20 CC 41 42 45 4C :A5
4429 53 D0 EC 46 01 11 D0 B3 :AA
4431 D7 FF 04 FD 04 C5 FF 16 :60
4439 9E FE 16 8C D4 13 46 0B :1C
```

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4441 91 20 0B F1 91 91 D0 EC :38
4449 D1 4E 5C 8A F5 FD 12 F5 :CE
4451 FD 13 AF 9E 0B 94 D4 04 :93
4459 52 03 65 8A 05 94 D4 05 :8C
4461 8A 0B 81 72 52 02 05 94 :B4
4469 D4 05 8A 03 81 72 52 03 :77
4471 05 94 D4 13 8A 03 81 72 :40
4479 23 C8 9E CD 00 28 FC 76 :C3
4481 3F 20 A0 20 FB D5 9E 6B :DF
4489 32 C8 9E CD 00 28 52 02 :9C
4491 05 94 F5 FC 76 3F 2B 9F :79
4499 00 94 F7 8D D4 0C 8A 0B :63
44A1 82 6B 8A 00 82 60 D1 86 :C7
44A9 5C 46 01 53 1A 9D D4 07 :13
44B1 20 FF 00 D1 06 5D 52 02 :AC
44B9 05 94 D4 0B 20 FF 00 8A :6B
44C1 00 82 60 52 02 05 94 F5 :0B
44C9 FC 76 3F 2B 9F 00 94 F7 :F8
44D1 8D D4 0C 8A 0B 82 6B 8A :D1
44D9 00 82 60 D1 EB 5C FD 15 :52
44E1 C8 8A CD 3B 2B 52 C5 C2 :2D
44E9 55 3C 94 D4 04 D1 F0 5D :33
44F1 52 02 05 93 D4 04 D1 6B :EC
44F9 5D 8A E5 FC 9C 2A FD 00 :FB
4501 07 A1 D0 E9 46 01 53 1A :06
4509 9D F5 FC 9C 2A 20 07 A1 :BE
4511 4F 00 9D F7 8F D4 0B 8A :5D
4519 E5 EC E9 D1 C9 5D 32 00 :4D
4521 8B D4 0B 8A E5 EC E9 D1 :7B
4529 C9 5D 8A E5 FC 9C 2A FD :7F
4531 00 07 A1 C3 FE 02 81 09 :FE
4539 82 E7 20 07 A1 D0 EC E9 :C5
4541 D1 C9 5D 8A E5 FC 76 3F :75
4549 20 9F FC 9C 2A 07 A1 D0 :ED
4551 E9 46 01 53 1A 9D F5 8A :47
4559 00 82 FC 76 3F 9F FC 9C :E1
4561 2A 07 A1 4F 00 9D F7 8F :9E
4569 D4 0B 8A E5 EC E9 D1 C9 :8F
4571 5D 8A 00 82 12 8C D4 0B :97
4579 8A E5 EC E9 D1 C9 5D 8A :DA
```



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4581 E5 FC 76 3F 20 9F FC 9C :D9
4589 2A 07 A1 C3 FE 02 81 09 :80
4591 82 E7 8A 00 82 FC 76 3F :22
4599 9F FC 9C 2A 07 A1 D0 EC :A4
45A1 E9 AC 20 38 46 01 53 1A :82
45A9 9D D4 04 D1 E0 50 52 02 :19
45B1 05 93 D4 05 8A 00 82 60 :A8
45B9 46 01 4D FE 14 9C D4 04 :D7
45C1 D1 86 5E 52 02 F5 29 CE :56
45C9 46 01 11 D0 20 CF 46 3D :CF
45D1 C4 4F 20 D9 4F 55 20 D7 :17
45D9 49 53 48 20 D4 4F 20 D2 :8D
45E1 45 50 4F 53 49 54 49 4F :DA
45E9 4E 20 D0 41 50 45 52 20 :56
45F1 4F 52 20 06 F1 D3 54 4F :C6
45F9 50 20 D0 52 49 4E 54 49 :15
4601 4E 47 20 28 D2 2F D3 29 :1D
4609 20 3F D0 EC DC 61 46 01 :4A
4611 52 01 9C F5 46 01 53 01 :8D
4619 9C F7 8D D4 04 D1 37 5E :04
4621 46 01 53 01 9D D4 04 D1 :12
4629 9E 5E 46 1E 11 D0 D0 4F :F7
4631 53 49 54 49 4F 4E 20 D0 :F4
4639 41 50 45 52 20 41 4E 44 :98
4641 20 D0 52 45 53 53 20 27 :83
4649 D2 27 D0 EC DC 61 46 01 :0C
4651 52 01 9C D4 04 D1 77 5E :F3
4659 D1 98 5E 9E FE 16 94 D4 :17
4661 04 D1 98 5E FD 16 C8 8A :A1
4669 CD 38 28 8A E5 EC E9 D5 :4D
4671 AC 28 00 8A B1 52 02 F5 :A8
4679 29 CE D8 23 C8 9E CD 00 :97
4681 28 FC 76 3F 20 A0 9E F9 :70
4689 D5 46 17 93 81 C4 4F 20 :C0
4691 59 4F 55 20 57 49 53 48 :F4
4699 20 54 4F 20 53 45 4C 45 :46
46A1 43 54 D0 EC 46 1D 11 31 :86
46A9 29 20 1F C1 44 44 52 45 :C4
46B1 53 53 45 53 20 54 4F 20 :85
46B9 42 45 20 D0 D2 C9 CE D4 :36
46C1 C5 C4 81 D0 EC 46 1D 11 :63
46C9 32 29 20 1F C1 44 44 52 :F1
46D1 45 53 53 45 53 20 54 4F :E8
46D9 20 42 45 20 CF CD C9 D4 :C3
46E1 D4 C5 C4 81 D0 EC 46 13 :A8
46E9 11 33 29 20 1F D4 4F 54 :86
46F1 41 4C 20 D0 52 49 4E 54 :78
46F9 4F 55 54 D0 EC 46 00 FF :65
4701 01 46 1B 11 1E C5 4E 54 :19
4709 45 52 20 D3 45 4C 45 43 :89
4711 54 49 4F 4E 20 D2 45 51 :12
4719 55 49 52 45 44 20 D0 B3 :65
4721 D7 FF 01 FD 01 C5 65 8A :A2
4729 05 93 F5 52 02 05 93 F7 :5F
4731 8D F5 52 03 05 93 F7 8D :5D
4739 D4 19 46 01 91 D0 52 18 :DF
4741 EA 46 05 20 05 F1 D0 EC :14
4749 46 02 91 91 D0 D1 28 5F :8F
4751 52 03 05 94 D4 12 23 C8 :E4
4759 9E CD 00 20 FC 76 3F 20 :99
4761 A0 20 F8 D5 D1 CF 59 9E :CA
4769 68 23 F5 52 14 CC 9E CD :26
4771 00 28 46 01 93 D0 52 13 :2B
4779 C8 9E CD 38 28 20 07 82 :8F
4781 55 0A 8B D4 05 46 01 1D :86
4789 D0 46 01 1F D0 20 07 82 :74
4791 CF 46 01 1E D0 20 07 82 :77
4799 FC 9C 2A 55 01 A1 F5 52 :AC
47A1 23 F7 D0 D0 EC 27 00 82 :1E
47A9 F5 8A 03 81 F7 94 D4 04 :F5
47B1 D1 E3 5F AC 28 38 46 23 :2E
47B9 11 96 C5 4E 54 45 52 20 :FC
47C1 4E 55 4D 42 45 52 53 20 :31
47C9 53 45 4C 45 43 54 45 44 :E7
47D1 20 4F 4E 45 20 42 59 20 :27
47D9 4F 4E 45 D0 EC 46 25 C5 :3D
47E1 4E 54 45 52 20 27 C3 27 :04
47E9 20 54 4F 20 C3 4F 4E 54 :88
47F1 49 4E 55 45 20 4F 52 20 :A0
47F9 27 D0 27 D0 54 4F 20 D0 :92
4801 52 49 4E 54 D0 EC B3 D7 :53
4809 FF 17 46 01 50 FE 17 9D :18
4811 D4 04 D1 CF 59 46 01 43 :1B
4819 FE 17 9D D4 04 D1 B3 60 :FA
4821 FD 17 C5 FF 1D 23 FE 1D :D3
4829 95 D4 04 D1 67 60 FC 76 :8C
4831 3F 28 A0 FD 1D F8 8A 08 :18
4839 82 68 46 01 91 D0 46 0D :6D
4841 20 D0 F1 D0 EC 46 01 91 :5C
4849 D0 D1 33 60 AC 28 00 46 :4F
4851 17 11 96 C5 4E 54 45 52 :50
4859 20 27 C3 27 20 54 4F 20 :6C
4861 C3 4F 4E 54 49 4E 55 45 :87
4869 D0 DC 61 46 01 43 01 CF :A9
4871 D4 04 D1 A0 60 D1 CF 59 :76
4879 46 22 13 9A 0E 08 1D 0D :4C
4881 F1 11 03 F1 2A 0E F1 D0 :9D
4889 EC 46 18 20 D0 F1 2A 20 :DE
4891 CC C1 C2 C5 CC C5 D2 20 :90
4899 36 34 20 2A D0 EC 46 1B :98
48A1 20 D0 F1 2A 0E F1 D0 EC :51
48A9 46 2B 13 11 07 F1 1D 05 :7D
48B1 F1 D4 48 45 20 50 52 4F :68
48B9 47 52 41 4D 20 48 41 53 :49
48C1 20 42 45 45 4E 20 53 45 :FA
48C9 54 20 57 49 54 48 3A D0 :EF
48D1 EC 46 1E 11 1D 05 F1 37 :E4
48D9 20 4C 49 4E 45 53 20 4F :46
48E1 46 20 33 35 20 43 48 41 :05
48E9 52 41 43 54 45 52 53 D0 :DF
48F1 EC 52 F8 F5 52 04 CE 43 :B1
48F9 90 D0 00 04 F1 7F 40 F8 :67
4901 07 F5 52 0D CE 52 27 1F :16
4909 82 F5 9E CE 3F F5 9E CE :41
4911 40 A7 02 FF 06 FD 05 F5 :7E
4919 9E CE 9E FF 2E 52 3F CB :0B
4921 9E CD 00 28 20 49 40 03 :26
4929 82 F5 9E CE D5 52 18 F5 :0B
4931 52 03 CC 9E CD 00 28 20 :7D
4939 49 40 03 82 F5 52 FF CE :30
4941 D5 8A 15 94 D4 02 D8 46 :00
4949 27 1D 27 F1 78 46 28 13 :8E
4951 11 27 F1 6A FA 6C 3F 16 :FD
4959 62 12 A7 20 28 24 55 08 :86
4961 83 55 1F B2 A4 D8 9E 63 :A0
4969 8A 62 9E 64 52 07 68 52 :4C
4971 23 69 52 09 6E FA 71 3F :90
4979 37 62 19 A7 10 28 52 08 :18
4981 1C 83 55 31 82 F5 22 55 :43
4989 08 83 F7 82 A4 D8 46 06 :E1
4991 4C 41 42 45 4C 53 71 52 :4D
4999 27 C8 8A CD 00 28 46 01 :09
49A1 20 17 91 77 D5 52 26 17 :54
49A9 DD 17 91 FF 1A 46 27 11 :21
49B1 1D 05 F1 C4 4F 20 59 4F :EC
49B9 55 20 57 49 53 48 20 54 :45
49C1 4F 20 41 4C 54 45 52 20 :C2
49C9 54 48 49 53 20 28 D9 2F :CA
49D1 CE 29 20 3F D0 EC D2 E7 :DA
49D9 43 46 01 4E 01 9D D4 04 :81
49E1 D1 4F 63 46 0C 1D 05 F1 :25
49E9 11 C5 CE D4 C5 D2 3A D0 :18
49F1 EC 46 1C 11 1D 05 F1 CE :86
49F9 55 4D 42 45 52 20 4F 46 :74
4A01 20 4C 49 4E 45 53 20 28 :36
4A09 31 2D 32 32 29 D0 B3 D7 :3B
4A11 FF 29 FD 29 C5 68 8A 08 :48
4A19 8C F5 52 16 08 8B F7 8F :7F
4A21 D4 1C 46 01 91 D0 52 1D :D0
4A29 EA 46 08 20 08 F1 D0 EC :14
4A31 46 02 91 91 D0 D1 81 62 :4E
4A39 46 21 11 1D 05 F1 CE 55 :70
4A41 4D 42 45 52 20 4F 46 20 :8C
4A49 43 48 41 52 41 43 54 45 :71
4A51 52 53 20 28 31 2D 33 38 :70
4A59 29 D0 B3 D7 FF 2A FD 2A :CB
4A61 C5 69 8A 09 8C F5 52 26 :A1
4A69 09 8B F7 8F D4 19 46 01 :54
4A71 91 D0 52 21 EA 46 05 20 :74
4A79 05 F1 D0 EC 46 02 91 91 :68
4A81 D0 D1 FF 62 43 90 C0 1C :46
4A89 00 03 F1 F5 29 CE 43 90 :2B
4A91 C0 20 00 03 F1 F5 52 05 :75
4A99 09 8B 55 05 83 09 82 CE :8D
4AA1 46 1E 11 1D 05 F1 C4 4F :5C
4AA9 20 59 4F 55 20 57 49 53 :FC
4AB1 48 20 54 4F 20 41 4C 54 :4A
4AB9 45 52 20 54 48 45 D0 EC :67
4AC1 46 1A 1D 05 F1 27 D0 49 :3C
4AC9 4E 47 27 20 56 4F 4C 55 :DD
4AD1 4D 45 20 28 D9 2F CE 29 :E8
4AD9 20 3F D0 EC D2 E7 43 46 :1F
4AE1 01 4E 01 9D D4 04 D1 0C :47
4AE9 64 46 19 1D 05 F1 11 C5 :F5
4AF1 4E 54 45 52 20 D6 4F 4C :2A
4AF9 55 4D 45 20 28 30 2D 31 :E1
4B01 35 29 D0 B3 D7 FF 2B FD :05
4B09 28 C5 FF 18 9E FE 18 8C :2C
4B11 F5 52 0F FE 18 8B F7 8F :C1
4B19 D4 1C 46 01 91 D0 52 19 :85
4B21 EA 46 08 20 08 F1 D0 EC :0C
4B29 46 02 91 91 D0 D1 88 63 :7F
4B31 52 FB F5 FD 18 CE 9E 88 :A9
4B39 55 C8 88 73 29 08 83 13 :AB
4B41 84 85 74 52 46 14 8B D4 :15
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5929 F0 0F F0 F0 0F F0 00 0F :29
5931 F0 F0 0F FF B0 0F FF F0 :7C
5939 FF 00 0F FF F0 00 FF 90 :89
5941 F0 0F FF F0 2F FF F0 0F :7B
5949 F0 FF 06 E1 F0 0F FF 00 :CF
5951 00 F0 F0 0F 00 FF 03 E1 :53
5959 F0 FF 00 FF F0 0F FF 00 :45
5961 FF 00 FF 00 FF 00 FF 00 :50
5969 FF 00 0F 00 00 FF 00 FF :86
5971 00 FF 00 FF 00 FF 00 FF :5C
5979 00 FF 00 0F FF 00 FF 00 :A6
5981 FF 00 FF 00 FF 00 FF 00 :70
5989 FF 00 FF 0F 00 FF 00 FF :B2
5991 00 FF 00 FF 00 FF 00 FF :7C
5999 00 FF F0 00 FF 00 FF 00 :5A
59A1 FF 00 FF 00 FF 00 FF 00 :90
59A9 FF 00 00 FF 00 FF 00 FF :95
59B1 00 FF 00 FF 00 FF 00 FF :9C
59B9 00 FF F0 00 FF 00 FF 00 :7A
59C1 FF CF 00 0F FF 00 FF 00 :8D
59C9 FF 00 00 FF 00 FF 00 FF :85
59D1 00 FF 00 FF 00 FF 00 FF :BC
59D9 F0 0F 0F 00 FF 00 FF 00 :07
59E1 FF 00 FF 00 FF 00 0F 00 :40
59E9 FC 00 00 FF 00 FF 00 FF :D2
59F1 00 FF 00 FF 00 FF 00 FF :DC
59F9 00 FF FF 20 FF 00 FF 00 :67
5A01 FF 00 FF 00 0F 00 03 E1 :64
5A09 F0 00 00 FF F0 FF CF FF :EA
5A11 00 FF 00 FF F0 01 0F 0F :A1
5A19 F0 F1 0F 00 00 FF F0 0F :19
5A21 FF 00 0F F0 F0 0F F0 0F :1E
5A29 0F F0 0F FF F0 0F 0F F0 :33
5A31 00 FF F0 00 0F 00 FF F0 :C2

5A39 00 0F FF 00 FF 0F F0 00 :3B
5A41 0F C0 00 0F 30 0F 00 06 :85
5A49 E1 0F F0 00 FF FF 0F 0F :ED
5A51 F0 FF 00 03 E1 0F 00 FF :01
5A59 00 0F F0 00 FF 00 FF 00 :3A
5A61 FF 00 FF 00 FF 00 FF F0 :D0
5A69 FF FF 00 FF 00 FF 00 FF :53
5A71 00 FF 00 FF 00 FF 00 FF :5C
5A79 F0 00 FF 00 FF 00 FF 00 :59
5A81 FF 00 FF 00 FF 00 FF 00 :70
5A89 F0 FF 00 FF 00 FF 00 FF :64
5A91 00 FF 00 FF 00 FF 00 0F :FC
5A99 FF 00 FF 00 FF 00 FF 00 :8B
5AA1 FF 00 FF 00 FF 00 FF FF :8B
5AA9 00 FF 00 FF 00 FF 00 FF :94
5AB1 00 FF 00 FF 00 FF 00 0F :1C
5AB9 FF 00 FF 00 FF 00 B0 FF :77
5AC1 F0 00 FF 00 FF 00 FF FF :99
5AC9 00 FF 00 FF 00 FF 00 FF :B4
5AD1 00 FF 00 FF 00 0F F0 F0 :34
5AD9 FF 00 FF 00 FF 00 FF 00 :CB
5AE1 FF 00 FF F0 FF 03 FF FF :9A
5AE9 00 FF 00 FF 00 FF 00 FF :D4
5AF1 00 FF 00 FF 00 FF 00 00 :E4
5AF9 CF 00 FF 00 FF 00 FF 00 :8B
5B01 FF F0 FF 03 E1 0F 0F FF :BB
5B09 00 0F 00 F3 00 FF 00 FF :E4
5B11 00 0F FE F0 F0 0F 0C F0 :C6
5B19 FF FF 00 0F F0 00 FF F0 :7A
5B21 0F 0F F0 F0 0F F0 0F F0 :92
5B29 00 0F F0 F0 0F FF D0 0F :43
5B31 FF F0 FF 00 0F FF F0 00 :E1
5B39 FF D0 F0 0F FF F0 3F FF :2F
5B41 F0 DF F0 F0 FF 06 E1 F0 0F :26
5B49 FF 00 00 FF F0 F0 DF 00 FF :E9
5B51 03 E1 F0 FF 00 FF F0 0F :E3
5B59 FF 00 FF 00 FF 00 FF 00 :4B
5B61 FF 00 FF 00 0F 00 00 FF :9F
5B69 00 FF 00 FF 00 FF 00 FF :54
5B71 00 FF 00 FF 00 0F FF 00 :8D
5B79 FF 00 FF 00 FF 00 FF 00 :6B
5B81 FF 00 FF 00 FF 0F 00 FF :C9
5B89 00 FF 00 FF 00 FF 00 FF :74
5B91 00 FF 00 FF D0 00 FF 00 :93
5B99 FF 00 FF 00 FF 00 FF 00 :8B
5BA1 FF 00 FF 00 00 FF 00 FF :8E
5BA9 00 FF 00 FF 00 FF 00 FF :94
5BB1 00 FF 00 FF D0 00 FF 00 :B3
5BB9 FF 00 FF CF 00 1F FF 00 :A3
5BC1 FF 00 FF 00 00 FF 00 FF :AE
5BC9 00 FF 00 FF 00 FF 00 FF :B4
5BD1 00 FF F0 0F 0F 00 FF 00 :1E
5BD9 FF 00 FF 00 FF 00 FF 00 :CB
5BE1 0F 00 FD 00 00 FF 00 FF :D9
5BE9 00 FF 00 FF 00 FF 00 FF :D4
5BF1 00 FF 00 FF FF 30 FF 00 :FE
5BF9 FF 00 FF 00 FF 00 0F 00 :5B
5C01 03 E1 F0 10 00 FF F0 FF :57
5C09 0C FF 00 FF 00 FF F0 01 :A0
5C11 0F 0F F0 F3 0F 00 00 FF :1C
5C19 F0 0F FF 00 0F F0 F0 0F :16
5C21 F0 0F 0F F0 0F FF F0 0F :6B
5C29 0F F0 00 7F F0 00 0F 00 :2E
5C31 FF F0 00 0F FF 00 7F 0F :37
5C39 F0 00 0F C0 00 0F 10 0F :97
5C41 00 06 E1 0F F0 00 FF FF :CC
5C49 0F 0F 70 FF 00 03 E1 0F :72
5C51 00 FF 00 FF F0 00 FF 00 :33
5C59 FF 00 FF 00 FF 00 FF 00 :4B
5C61 FF F0 FF FF 00 FF 00 FF :2A
5C69 00 FF 00 FF 00 FF 00 FF :54
5C71 00 FF F0 00 FF 00 FF 00 :32
5C79 FF 00 FF 00 FF 00 FF 00 :6B
5C81 FF 00 F0 FF 00 FF 00 FF :3D
5C89 00 FF 00 FF 00 FF 00 FF :74
5C91 00 5F FF 00 FF 00 FF 00 :3F
5C99 FF 00 FF 00 FF 00 FF 00 :8B
5CA1 FF FF 00 FF 00 FF 00 FF :8B
5CA9 00 FF 00 FF 00 FF 00 FF :94
5CB1 00 4F FF 00 FF 00 FF 00 :3F
5CB9 30 FF F0 00 FF 00 FF 00 :AA
5CC1 FF FF 00 FF 00 FF 00 FF :AB
5CC9 00 FF 00 FF 00 FF 00 0F :34
```


38
85
ED
01
3A
00
53
5C
59
70
64
FC
08
88
94
1C
77
99
84
34
CB
9A
04
E4
88
E4
C6
7A
92
43
E1
2F
26
E9
E3
48
9F
54
8D
68
C9
74
93
88
8E
94
83
A3
AE
84
1E
CB
08
04
FE
58
57
A0
1C
16
68
2C
37
97
CC
72
33
48
2A
54
32
68
3D
74
3F
88
88
94
3F
AA
AB
34

SCD1 F0 F0 FF 00 FF 00 FF 00 :91
SCD9 FF 00 FF 00 FF F0 FF 03 :80
SCE1 FF FF 00 FF 00 FF 00 FF :CB
SCE9 00 FF 00 FF 00 FF 00 FF :04
SCF1 00 00 CF 00 FF 00 FF 00 :51
SCF9 FF 00 FF F0 FF 03 E1 0F :60
SD01 0F FF 00 0F 00 F3 00 FF :C3
SD09 00 FF 00 0F FC F0 F0 0F :06
SD11 08 F0 F0 FF 00 0F F0 00 :D5
SD19 FF F0 0F 0F F0 0F F0 F0 :7A
SD21 0F F0 00 0F F0 F0 0F FF :FC
SD29 D0 0F FF F0 FF 00 0F FF :2F
SD31 F0 00 FF D0 F0 0F FF F0 :E0
SD39 0F FF F0 FF F0 FF 06 E1 :ED
SD41 F0 0F FF 00 00 F0 F0 FF :73
SD49 00 FF 03 E1 F0 FF 00 FF :75
SD51 F0 08 FF 00 FF 00 FF 00 :41
SD59 FF 00 FF 00 FF 00 0F 00 :88
SD61 00 FF 00 FF 00 FF 00 FF :4C
SD69 00 FF 00 FF 00 FF 00 0F :D4
SD71 FF 00 FF 00 FF 00 FF 00 :60
SD79 FF 00 FF 00 FF 00 FF 0F :E0
SD81 00 FF 00 FF 00 FF 00 FF :6C
SD89 00 FF 00 FF 00 FF C0 00 :8C
SD91 FF 00 FF 00 FF 00 FF 00 :80
SD99 FF 00 FF 00 FF 00 00 FF :87
SDA1 00 FF 00 FF 00 FF 00 FF :8C
SDA9 00 FF 00 FF 00 FF C0 00 :DC
SDB1 FF 00 FF 00 FF 00 FF 4F 00 :F9
SDB9 FF 00 FF 00 FF 00 00 FF :A7
SDC1 00 FF 00 FF 00 FF 00 FF :AC
SDC9 00 FF 00 FF F0 0F 0F 00 :35
SD01 FF 00 FF 00 FF 00 FF 00 :C0
SD09 FF 00 0F 00 F0 00 00 FF :ED
SDE1 00 FF 00 FF 00 FF 00 FF :CC
SDE9 00 FF 00 FF 00 FF FF 30 :55
SDF1 0F 00 FF 00 FF 00 FF 20 :E0
SDF9 0F 00 03 E1 F0 20 00 FF :FC
SE01 F0 FF 0C FF 00 FF 00 FF :00
SE09 F0 03 0F 0F F0 FA 0F 01 :64
SE11 00 FF F0 0F FF 00 0F F0 :FE
SE19 F0 0F F0 0F 0F F0 0F FF :7E
SE21 0F 0F 0F F0 00 3F F0 00 :25
SE29 0F 00 FF F0 00 0F FF 00 :47
SE31 2F 0F F0 00 0F F0 00 0F :80
SE39 00 0F 00 06 E1 0F F0 00 :8D
SE41 FF FF 0F 0F 00 FF 00 03 :88
SE49 E1 0F 00 FF 00 0F FF 00 :96
SE51 FF 00 FF 00 FF 00 FF 00 :40
SE59 FF 00 FF F0 FF FF 00 FF :01
SE61 00 FF 00 FF 00 FF 00 FF :4C
SE69 00 FF 00 FF F0 00 FF 00 :08
SE71 FF 00 FF 00 FF 00 FF 00 :60
SE79 FF 00 FF 00 F0 FF 00 FF :16
SE81 00 FF 00 FF 00 FF 00 FF :6C
SE89 00 FF 00 6F FF 00 FF 00 :36
SE91 FF 00 FF 00 FF 00 FF 00 :80
SE99 FF 00 FF FF 00 FF 00 FF :82
SEA1 00 FF 00 FF 00 FF 00 FF :8C
SEA9 00 FF 00 2F FF 00 FF 00 :56
SEB1 FF 00 80 FF F0 00 FF 00 :64
SEB9 FF 00 FF 00 FF 00 FF 00 :A2
SEC1 00 FF 00 FF 00 FF 00 FF :AC
SEC9 00 0F F0 F0 FF 00 FF 00 :6A
SED1 FF 00 FF 00 FF 00 FF F0 :40
SED9 FF 00 FF 00 FF 00 FF 00 :C2
SEE1 00 FF 00 FF 00 FF 00 FF :CC
SEE9 00 FF 00 00 CF 00 FF 00 :EA
SEF1 FF 00 FF 00 FF F0 FF 03 :98
SEF9 E1 0F FF FF 00 0F 00 F3 :E2
SF01 00 FF 00 FF 00 0F F0 F0 :BF
SF09 F0 0F 0D F0 F4 FF 00 0F :33
SF11 F0 00 FF F0 07 0F 00 0F :42
SF19 F0 F0 0F F0 00 0F F0 F0 :3F
SF21 0F FF D0 0F FF F0 FF 00 :6D
SF29 0F FF 00 00 7F D0 0F 0F :68
SF31 FF F0 0F 0F 00 FF F0 FF :6A
SF39 06 E1 F0 0F FF 00 00 F0 :87
SF41 F0 DF 00 FF 03 E1 F0 FF :C7
SF49 00 FF F0 04 FF 00 FF 00 :1A
SF51 FF 00 FF 00 FF 00 FF 00 :40
SF59 0F 00 00 FF 00 FF 00 FF :55
SF61 00 FF 00 FF 00 FF 00 FF :4C

SF69 00 0F FF 00 FF 00 FF 00 :77
SF71 FF 00 FF 00 FF 00 FF 00 :60
SF79 7F 0F 00 FF 00 FF 00 FF :03
SF81 00 FF 00 FF 00 FF 00 FF :6C
SF89 40 00 FF 00 FF 00 FF 00 :89
SF91 FF 00 FF 00 FF 00 FF 00 :80
SF99 00 FF 00 FF 00 FF 00 FF :84
SFA1 00 FF 00 FF 00 FF 00 FF :8C
SFA9 C0 00 FF 00 FF 00 FF CF :D1
SFB1 00 0F FF 00 FF 00 FF 00 :8F
SFB9 00 FF 00 FF 00 FF 00 FF :A4
SFC1 00 FF 00 FF 00 FF F0 0F :8C
SFC9 0F 00 FF 00 FF 00 FF 00 :C8
SFD1 FF 00 FF 00 0F 00 FF 00 :10
SFD9 00 FF 00 FF 00 FF 00 DF :C4
SFE1 00 FF 00 FF 00 FF 00 FF :CC
SFE9 FF 30 FF 00 FF 00 FF 00 :38
SFF1 FF 00 0F 00 03 E1 F0 00 :01
SFF9 00 FF F0 FF 0C FF 00 FF :F0
6001 00 FF F0 00 0F 0F F0 F6 :83
6009 0F 02 00 FF F0 0F FF 00 :1A
6011 0F F0 F0 0F F0 0F 0F F0 :FE
6019 0F FF F0 0F 0F F0 00 0F :94
6021 F0 00 0F 00 FF F0 00 0F :50
6029 FF 00 2F 0F F0 00 0F F0 :89
6031 00 0F 00 0F 00 06 E1 0F :4D
6039 F0 00 FF FF 0F 0F 00 FF :8E
6041 00 03 E1 0F 00 FF 00 0F :97
6049 FF 00 FF 00 FF 00 FF 00 :39
6051 FF 00 FF 00 FF F0 FF FF :D8
6059 00 FF 00 FF 00 FF 00 FF :44
6061 00 FF 00 FF 00 FF F0 00 :E4
6069 FF 00 FF 00 FF 00 FF 00 :58
6071 FF 00 FF 00 FF 00 F0 FF :EF
6079 00 FF 00 FF 00 FF 00 FF :64
6081 00 FF 00 FF 00 3F FF 00 :ED
6089 FF 00 FF 00 FF 00 FF 00 :78
6091 FF 00 FF 00 FF FF 00 FF :79
6099 00 FF 00 FF 00 FF 00 FF :84
60A1 00 FF 00 FF 00 2F FF 00 :AD
60A9 FF 00 FF 00 30 FF 80 00 :5E
60B1 FF 00 FF 00 FF FF 00 FF :99
60B9 00 FF 00 FF 00 FF 00 FF :A4
60C1 00 FF 00 0F F0 F0 FF 00 :43
60C9 FF 00 FF 00 FF 00 FF 00 :88
60D1 FF F0 FF 00 FF FF 00 FF :99
60D9 00 FF 00 FF 00 FF 00 FF :C4
60E1 00 FF 00 FF 00 00 CF 00 :83
60E9 FF 00 FF 00 FF 00 EF F0 :EB
60F1 FF 03 E1 0F FF FF 00 0F :41
60F9 00 F3 00 FF 00 FF 00 0F :4C
6101 FE F0 F0 0F 02 F0 F4 FF :38
6109 00 0F F0 00 FF F0 07 0F :3A
6111 F0 0F F0 F0 0F F0 00 0F :11
6119 F0 F0 0F FF F0 0F FF F0 :94
6121 FF 00 0F FF F0 00 3F F0 :31
6129 F0 0F 0F 0F 0F FF F0 FF :C0
6131 F0 FF 06 E1 F0 0F FF 00 :87
6139 00 F0 F0 FF 00 FF 03 E1 :FB
6141 F0 FF 00 FF F8 00 FF 00 :FB
6149 FF 00 FF 00 FF 00 FF 00 :36
6151 FF 00 0F 00 00 FF 00 FF :6E
6159 00 FF 00 FF 00 FF 00 FF :44
6161 00 FF 00 0F FF 00 FF 00 :8E
6169 FF 00 FF 00 FF 00 FF 00 :58
6171 FF 00 3F 8F 00 FF 00 FF :5A
6179 00 FF 00 FF 00 FF 00 FF :64
6181 00 FF 50 00 FF 00 FF 00 :62
6189 FF 00 FF 00 FF 00 FF 00 :78
6191 FF 00 00 FF 00 FF 00 FF :7D
6199 00 FF 00 FF 00 FF 00 FF :84
61A1 00 FF D0 00 FF 00 FF 00 :02
61A9 FF CF 00 1F FF 00 FF 00 :85
61B1 FF 00 00 FF 00 FF 00 FF :9D
61B9 00 FF 00 FF 00 FF 00 FF :A4
61C1 F0 0F 0F 00 FF 00 FF 00 :EF
61C9 FF 00 FF 00 FF 00 FF 00 :28
61D1 FF 00 00 FF 00 FF 00 FF :8D
61D9 00 FF 00 FF 00 FF 00 FF :C4
61E1 00 FF FF 30 FF 00 FF 00 :8F
61E9 FF 00 FF 00 0F 00 03 E1 :4C
61F1 F0 00 00 FF F0 FF 0C FF :D2
61F9 00 FF 00 FF F0 05 0F 0F :A1

6201 F0 FF 0F 03 00 FF F0 0F :29
6209 FF 00 0F F0 F0 0F F0 0F :06
6211 0F F0 0F FF F0 0F 0F F0 :18
6219 00 0F F0 00 0F 00 FF F0 :CA
6221 00 0F FF C0 0F 0F F0 00 :70
6229 0F F0 00 0F 00 0F 00 06 :DD
6231 E1 0F F0 00 FF FF 0F 0F :05
6239 00 FF 00 03 E1 0F 00 FF :F9
6241 00 07 FF 00 FF 00 FF 00 :3F
6249 FF 00 FF 00 FF 00 FF F0 :88
6251 FF FF 00 FF 00 FF 00 FF :3B
6259 00 FF 00 FF 00 FF 00 FF :44
6261 F0 00 FF 00 FF 00 FF 00 :41
6269 FF 00 FF 00 FF 00 FF C0 :58
6271 70 FF 00 FF 00 FF 00 FF :CC
6279 00 FF 00 FF 00 FF 00 6F :E4
6281 FF 00 FF 00 FF 00 FF 00 :70
6289 FF 00 FF 00 FF 00 FF FF :70
6291 00 FF 00 FF 00 FF 00 FF :7C
6299 00 FF 00 FF 00 FF 00 6F :04
62A1 FF 00 FF 00 FF 00 30 FF :DF
62A9 80 00 FF 00 FF 00 FF FF :41
62B1 00 FF 00 FF 00 FF 00 FF :9C
62B9 00 FF 00 FF 00 0F F0 F0 :1C
62C1 FF 00 FF 00 FF 00 FF 00 :80
62C9 FF 00 FF F0 FF 00 FF FF :70
62D1 00 FF 00 FF 00 FF 00 FF :8C
62D9 00 FF 00 FF 00 FF 00 00 :CC
62E1 CF 00 FF 00 FF 00 FF 00 :A0
62E9 FF F0 FF 03 E1 0F FF FF :80
62F1 00 0F 00 F3 00 FF 00 FF :CC
62F9 00 0F FF F0 F0 0F 00 FF :D5
6301 E1 00 FF E1 00 FF E1 00 :83
6309 FF E1 00 FF E1 00 FF E1 :28
6311 00 FF E1 00 FF E1 00 FF :EA
6319 E1 00 FF E1 00 FF E1 00 :98
6321 FF E1 00 FF E1 00 FF E1 :43
6329 00 FF E1 00 FF E1 00 FF :02
6331 E1 00 FF E1 00 FF E1 00 :83
6339 FF E1 00 FF E1 00 FF E1 :58
6341 00 FF E1 00 FF E1 00 FF :1A
6349 E1 00 FF E1 00 FF E1 00 :CB
6351 FF E1 00 FF E1 00 4E E1 :9C
6359 31 EA 66 FE 47 FE 4A F3 :7C
6361 91 F2 0E F2 50 F2 33 F3 :00
6369 57 F1 CA F1 ED F6 3E F1 :62
6371 2F F3 66 FE A5 F4 ED F5 :C3
6379 00 FF E1 00 FF E1 00 82 :6A
6381 E1 78 A9 34 85 01 A0 00 :18
6389 84 F8 84 FD A9 A0 85 FC :12
6391 A9 D0 85 FE B1 F8 91 FD :96
6399 CB D0 F9 E6 FC E6 FE D0 :45
63A1 F3 A9 37 85 01 58 20 44 :83
63A9 E5 4C 10 08 00 03 E1 4F :26
63B1 4E A2 00 D0 F4 63 9D 10 :17
63B9 01 E8 D0 F7 A2 34 BD 58 :3A
63C1 64 9D 00 03 E8 D0 F7 EA :E3
63C9 EA A2 FF 9A A9 08 58 2D :83
63D1 38 E9 01 85 FE A9 D0 85 :85
63D9 2E E9 00 85 FF A9 B1 85 :DC
63E1 FC A9 63 85 FD A0 21 D0 :D1
63E9 85 F8 4C 52 01 00 00 00 :94
63F1 00 00 00 00 00 08 00 00 :57
63F9 9E 32 30 36 31 00 00 00 :57
6401 4C D0 CF A9 0C BD 20 D0 :E7
6409 8D 21 D0 EA A9 36 85 01 :28
6411 4C 64 51 48 C6 FC A5 FC :60
6419 C9 FF D0 02 C6 FD 68 60 :FB
6421 48 AD 20 D0 49 03 BD 20 :8C
6429 D0 C6 FE A5 FE C9 FF D0 :37
6431 02 C6 FF 68 60 A0 00 B1 :83
6439 FC C9 E1 D0 18 EA EA EA :53
6441 20 30 01 B1 FC AA 20 30 :CF
6449 01 B1 FC 91 FE 20 3D 01 :4C
6451 CA D0 F8 F0 05 91 FE 20 :D3
6459 3D 01 A6 FC CA 86 FC E0 :73
6461 FF D0 02 C6 FD A5 FE C9 :26
6469 1F A5 FF E9 08 B0 CB A5 :5A
6471 F8 BD 20 D0 A9 37 85 01 :67
6479 20 60 A6 20 8E A6 A2 1F :DA
6481 8D 10 01 9D 00 08 CA D0 :0A
6489 F7 A9 E1 4C 34 03 BD 0C :F5
6491 4D BD AC 50 4C AE A7 11 :E4

Hex Data Entry

*Introducing the Your Commodore Hex Data Entry
Program to make our listings even more accessible.*

By M.C. Stretton assisted by P.A. Eves

The *Your Commodore Hex Data Entry* program has been written with you, the reader in mind. No longer will it be a painstaking ordeal, typing in all the long lists of data. This program will ensure a 100% correct entry, each and every time you use it.

I have made this version as streamlined as possible so as to save you having to type in a large program. There are only four options in this version: LOAD DATA; SAVE DATA; ENTER DATA; PRINT DATA. There will be a much larger version coming shortly which will give lost more options and will have Windows, Redefined Chars, Scrolling Text etc.

On first entering the Hex Data Entry, only the LOAD DATA and DATA ENTRY options are available to you. This is because the buffer is empty, and the other two options require data to be present. On selecting the LOAD DATA option, you are asked for TAPE or DISK. Press either 'T' or 'O' then RETURN. The program remembers that last input/output, and so it is possible to just hit RETURN if the correct device type is being displayed. You are then required to enter a filename.

Tape users please note, to cut down on errors for disk users, you will not be allowed to enter a blank filename. Filenames can be a combination of any characters, except graphics, up to 16 in number. If you should make an error in your filename entry, you may either delete single characters by the DEL key, or SHIFT/CLRHOM will delete the whole filename. Be extremely careful when typing in your filename, errors can be fatal, so make sure you only use filenames that are stored on whatever device you are using. After the prompt, hit return and the file will be loaded into the buffer. The program will allow files up to 95 blocks in length to be loaded in. If you want larger programs entered, you will have to split them into two or more parts first. After the load, control is passed back to the main menu.

The save option is identical to the load, except that it takes the contents of the buffer and saves them out to the given start address. This will save an executable file, that can be loaded and

run, independent of the Input program.

Data Entry

The Data Entry option is the option by which you can enter data from *Your Commodore*, or your own creations. Once this option is selected you are asked if you want to continue from the given address. If you have just 'LOADed' a file, this address will be the next available byte in the buffer. (Allowing you to add more data to the end of the loaded file). This is also true of the program currently in memory. Therefore if you wish to continue typing in at the last address, type 'Y'. If 'N' is pressed the program assumes you are starting a fresh entry. When this happens the buffer is reset to zero, thus losing any program currently in memory. (I have chosen \$C000 as the normal start up address purely because most M/C progs reside here.) After pressing 'N', you are then asked for the starting address, in Hex. Any valid Hex number is acceptable, e.g. \$400, \$C00, \$0400. In this example, the first figure, \$400, would be interpreted as \$0400 by the program. Likewise \$286 is taken to be \$0286.

Once the start address is given, you are asked if you want checksums or not. If you are typing in a program from *Your Commodore* your response will be 'Y'. If you are entering your own program then select 'N'.

The screen display now changes to show the current address being poked into. Type any valid Hex number and the program automatically skips the next byte without the need to type commas, spaces or returns. If you make a mistake, one press of the DEL key will erase the whole number. If in the no checksum mode, when you get to the end of the line, the line will automatically scroll up ready for your next input.

If in checksum mode, after eight bytes are entered you must type the two digit checksum at the end of the line. Unlike the no checksum mode you now press return to enter the line.

If the program finds that the checksum does not match the line entered, a warning tone will be sound. You will then be asked if you wish to either: a) Re-enter the line or b) Re-enter the checksum.

After checking your line, if you find you have entered it wrongly, then press 'L'. The line will be erased and you then re-enter it correctly. If you find that you have only made a mistake in typing in the checksum, then press 'C' and re-enter it. Should you wish to stop entering data, simply press return or space bar on a blank line to get you back at the main menu. Here you may save your program so as to restart another day, or you may wish to see printout.

On choosing the print option, you have a choice of hard copy or screen copy. The listing can be paused at any time by pressing down and holding down any key. Pressing the RUN/STOP key and holding it down will break out of the print mode and return you to the main menu.

The left arrow key 'top left of the keyboard', acts as zero when typing your data. The space bar acts as the return key when entering data, thus leaving you free from searching for the return key.

The load option allows any program, less than 95 blocks, to be loaded into the buffer, so it is possible to load a basic program, obtain a Hex dump, then resave the program out to another tape or disk without harming it in any way.

I hope that this program will help take the drudgery out of typing in long lists of data statements.

```

Please use SYNTAX CHECKER
when entering this program

EC 10 REM ----- SETUP -----
AF 20 POKE788,52:CLR
03 30 DV=8:BU=16384:POKE650,12
   :POKE53280,12:POKE53281,12
   :POKE646,1:PRINT"[CLR,REV H,
   U SN]"
AA 35 REM SEE NOTES ON CREV T
   IN LISTINGS FOR DETAILS ON
   OW TO GET REV CHARACTERS
D6 40 CA$="$C000":CA=49152:SA
   A:TT=0
CB 50 GOSUB2180
SE 55 PRINT"[CLR]";
EF 60 REM ----- OPTIONS -----
OD 70 PRINT"[HOME,RUSOFF,BLACK
   C@40]";
7F 80 PRINT"[RUSON,BLACK] YOUR
   COMMODORE HEX INPUTTER - C
   1986 ";
11 90 PRINT"[RUSON] -DESIGNED
  
```




```

ND WRITTEN BY M C STRETTON- 01 510 IFTN=ANDCH$<>CK$THENGOS [WHITE,CLR]:RETURN
[RVSOFF]"; 02 520 GOTO340 99 890 IFK$="S"THENNU=3:GOTO940
68 95 PRINT"[RUSON,SPC10]ASSIST 82 525 ONQQGOTO529,526 49 900 IFK$="P"THENNU=4
ED BY P A EVES[SPC10,RVSOFF] 18 526 PRINT"[HOME,WHITE,DOWN24 A1 910 IFK$<>"S"ANDK$<>"P"THEN8
"; 09 527 PRINT".[LEFT5]"; E9 80
30 100 PRINT"[WHITE,DOWN6,RIGHT 13]CF13 LOAD DATA" AE 528 GOTO490
14 110 PRINT"[DOWN2,RIGHT13]CF3 26 529 BU=BU-B:CA=CA-B:GOTO325 E9 920 PRINT"[HOME,DOWN,BLACK,R
] SAVE DATA" E2 530 IFTN=OTHENGOSUB550:RETUR USON] SWITCH ON PRINTER THE
08 120 PRINT"[DOWN2,RIGHT13]CF5 AD N N PRESS RETURN[SPC3]"
] DATA ENTRY" 540 IFDN=OTHENPRINT"[LEFT3] 11 930 POKE198,0:WAIT198,1:GETA
50 130 PRINT"[DOWN2,RIGHT13]CF7 AO .[LEFT2]";:IN=IN-1:BU=BU-1:C $:IFAS<>CHR$(13)THENS20
05 140 GOSUB1250 550 IFL=>1THENIN$=LEFT$(IN$, 11 940 OPEN3,NU:PRINT#3
98 150 ONFKGOSUB1650,1770,180,8 BF L-1):PRINT"[LEFT]";:D 65 950 PS=16384:PE=16384+(CA-SA
60 N=DN-1 65 960 PRINT"[CLR]" ):PC=PS:AS=SA:IFPE=PSTHEN109
50 160 GOTO70 560 RETURN 16 970 IFPEEK(197)=63THENPRINT" O
23 170 REM ----- HEX INP BC 570 REM ----- NEWLINE 20 [WHITE,CLR]:AS=CA:GOTO1080
UT ----- D7 580 IFBU<40951THENS85 82 975 IFPEEK(203)<>64THENS70
BA 180 GOSUB1970 581 GOSUB2560:PRINT"[HOME,DO C9 980 DE=AS:GOSUB1110:CA$=LEFT
08 190 PRINT"[HOME,DOWN,BLACK,R 93 WN,RVSON]WARNING: BUFFER ALM C3 980 DE=AS:GOSUB1110:CA$=LEFT
USON]CONTINUE FROM[SPC27,UP, 14 OST FULL-B BYTES LEFT[WHITE] 38 $("0000",4-LEN(HH$))+HH$
F4 200 POKE198,0:WAIT198,1:GETA $; 82 990 CK=0:PRINT#3,"[SPC4]";CA
$ 582 FORA=1TO4000:NEXT:GOSUB2 62 1000 FORX=0TO7:Q=FRE(0)
F9 210 IFAS="N"THENBU=16384:GOT D7 160 1010 DE=PEEK(PC+X):GOSUB1110
0240 585 DE=CA:GOSUB1110:CA$=LEFT 62 :B$=RIGHT$(HH$,2)
CE 220 IFAS="Y"THENPRINT"[WHITE F9 $("$0000",5-LEN(HH$))+HH$ 8A 1020 PRINT#3," ";B$;:NEXTX
1]";:GOTO260 590 PRINT"[HOME,DOWN24,RIGHT 8A 1030 GOSUB1990
C1 230 GOTO200 65 ,WHITE]";CA$;"[SPC4]... 38 1040 PRINT#3," ";CH$
EB 240 PRINT"[HOME,DOWN,BLACK,R 68 .. 8A 1050 PC=PC+B:AS=AS+B:KA=KA+B
USON]DATA ADDRESS: $.[SPC 78 600 IFZZ=OTHENPRINT" :.."; 1060 IFPC<PETHENGOTO970
21,UP,RIGHT15]"; 36 610 PRINT"[HOME,DOWN24,RIGHT 2B 1070 IFNU=3THENPOKE198,0:WAI
B5 250 GOSUB1320:PRINT"[WHITE,R C6 103]";:IN=0:DN=0:IN$="":RETUR T198,1
USOFF]";:HH$=IN$:GOSUB1190:S 670 CH=CH-INT(CH/256)*256:DE 4E 1080 PRINT"[CLR]";DE=AS:GOSU
A=DE:CA=DE:CA$=HH$ N 2B B1110:CA$=LEFT$("$0000",5-LE
6A 260 PRINT"[HOME,DOWN,BLACK,R N 1090 POKE198,0:PRINT#3:CLOSE N(HH$))+HH$
USON,SPC4]DO YOU WISH TO ENT 14 620 REM ----- CHEXUM --- 1C 1100 REM ----- DEC-HEX ---
ER CHECKSUMS?(SPC5,RVSOFF]"; EB 640 CH=0 16
20 270 POKE198,0:WAIT198,1:GETA 16 650 IFCA=SAHENRETURN 06 1110 A=INT(DE/256):B=DE-A*25
$ 80 660 FORX=1TO8:CH=CH+(X*(PEEK 6:C=INT(A/16):D=A-16*C
BB 280 IFAS="N"THENZZ=1:GOTO310 BD ((BU-9)+X)):NEXT 3B 1120 CS=CHR$(48+C):IFC>9THEN
C0 290 IFAS="Y"THENZZ=0:GOTO310 26 665 CH=CH+CA-B 3B CS=CHR$(C+55)
11 300 GOTO270 CE 670 CH=CH-INT(CH/256)*256:DE 0E 1130 DS=CHR$(48+D):IFD>9THEN
AS 310 PRINT"[CLR,WHITE]"; 30 )=CH:GOSUB1110:CH$=MID$(HH$,3 DS=CHR$(D+55)
87 320 SYSS9626 30 680 IFCH$<>CK$THENTT=1 FA 1140 E=INT(B/16):F=B-16*E
08 321 TT=0 3A 690 RETURN 3F 1150 ES=CHR$(48+E):IFE>9THEN
68 325 GOSUB580 ED 710 REM ----- GETCHECK 36 ES=CHR$(E+55)
86 330 B=SA:KA=SA:IN$=" 61 720 POKE198,0:CK$=" EA 1160 FS=CHR$(48+F):IFF>9THEN
40 340 GOSUB1250 61 730 GETLS:IFL$=" THEN730 88 1170 HH$=CS+DS+ES+FS:RETURN
BA 350 L=LEN(IN$) C3 740 L=LEN(CK$):IFL$=CHR$(20) 88 1180 REM ----- HEX-DE
77 360 IFAS=CHR$(20)THENGOSUB53 41 ANDL>OTHEN760 45 C -----
C3 370 IFAS=CHR$(13)ANDTN=OTHEN 87 750 GOTO770 1190 IFLEN(HH$)<4THENHH$=LEF
PRINT"[CLR]";RETURN 72 760 CK$=LEFT$(CK$,L-1):PRINT TS("0000"+HH$,4-LEN(HH$))+HH
12 380 IFAS=CHR$(32)ANDTN=OTHEN 80 "[LEFT]";:GOTO730 87 $
PRINT"[CLR]";RETURN 70 770 IFL$=CHR$(13)ANDL=2THENC 87 1200 A=ASC(HH$)-48:B=ASC(MID
30 390 IFAS="+"THENAS="0":GOTO4 34 K=VAL(CK$):RETURN 34 $ (HH$,2,1))-48
30 400 Y=0:IFASC(AS)>47ANDASC(A 02 780 IFL$=" "ANDL=2THENCK=VAL 34 :D=ASC(MID$(HH$,4,1))-48
$)<58THENY=1 60 (CK$):RETURN 50 1220 DE=256*(16*(A+7*(B+9))+
66 410 IFASC(AS)>64ANDASC(AS)<7 1B 800 Y=0:IFASC(L$)>47ANDASC(L B+7*(B+9))+16*(C+7*(D+9))+D+
1THENY=1 5C 810 IFASC(L$)>64ANDASC(L$)<7 5C 1230 RETURN
F1 420 IFY=OTHEN340 5C 820 IFY=0ORL=2THEN730 AC 1240 REM ----- F KEY
37 430 PRINTAS;:DN=DN+1:IFDN=2T 28 830 PRINTL$; 89 S -----
HENPRINT" ";:GOTO450 38 840 CK$=CK$+L$:GOTO730 89 1250 FK=0
18 440 IN$=IN$+AS:GOTO340 60 850 REM ----- PRINTER - F2 1260 POKE198,0:WAIT198,1:GET
1E 450 IN$=IN$+AS 60 AS
3E 460 HH$=IN$:GOSUB1190 87 860 IFCA=SAHENRETURN 95 1270 IFAS=CHR$(133)THENFK=1
A6 470 POKE BU,DE:CA=CA+1:BU=BU C9 870 GOSUB1970:PRINT"[HOME,DO 95 1280 IFAS=CHR$(134)THENFK=2
+1:DN=0:TN=TN+1:IN$=" 62 WN,RVSON,BLACK,SPC6]PRINT TO AD 51 1290 IFAS=CHR$(135)THENFK=3
95 480 IFTN=ANDZZ=1THENGOTO320 62 SCREEN OR PRINTER?[SPC7] EO 1300 IFAS=CHR$(136)THENFK=4
FB 490 IFTN=ANDZZ=OTHENPRINT"[ 880 POKE198,0:WAIT198,1:GETK 1310 RETURN
AD 500 IFTN=ANDCH$=CK$THENGOTO 880 1320 REM ----- GET ADDR
320 0E 885 IFK$=CHR$(136)THENPRINT" DA ESS -----
1340 GETLS:IFL$=" THEN1340 4A 1330 IN$="
1340 GETLS:IFL$=" THEN1340

```




```

27 1350 L=LEN(IN$):IFL$=CHR$(20 FB 1795 C=CA-INT(CA/256)*256:D= B4
)ANDL>OTHER1370 INT(CA/256):POKE831,C:POKE83
46 1360 GOTO1380 2,D 9C
B5 1370 IN$=LEFT$(IN$,L-1):PRIN 20 1797 IFDU<>1THEN1820
T"LEFTJ,LEFTJ";:GOTO1340 D1 1800 PRINT"HOME,DOWN,BLACK, 1F
D1 1380 IFL$=CHR$(13)ANDL>OTHER RVSONJPLACE TAPE IN DECK THE
RETURN N PRESS 'REC-PLAY'[C5]:SYS4 23
49 1385 IFL$=CHR$(32)ANDL>OTHER 9203:SYS49206
RETURN 97 1810 RETURN 4F
3B 1390 FLAG=0:IFASC(L$)>47ANDA 1A 1820 PRINT"HOME,DOWN,BLACK,
SC(L$)<58THENFLAG=1 RVSONJ PLACE DISK INTO DRIVE DC
63 1400 IFASC(L$)>64ANDASC(L$)< 71THENFLAG=1 96 1830 POKE198,0:WAIT198,1:GET 65
13 1410 IFFLAG<>1THENGOTO1340 AS:IFAS<>CHR$(13)THEN1830
3B 1420 IFL=4THENGOTO1340 BC 1840 PRINT"HOME,DOWN,BLACK, DC
A5 1430 PRINTL$; RVSONJSAVING[SPC34J"
8B 1440 IN$=IN$+L$:GOTO1340 6B 1850 PRINT"RVSON,UP3,RIGHT7 4A
A4 1450 REM ----- FILENAME J";FL$
----- 8A 1860 SYS49343 F6
C0 1460 PRINT"HOME,DOWN,RVSON, DB 1870 RETURN
BLACKJFILENAME:[SPC16J][SP E1 1880 REM ----- TAPE OR
C12,UP,RIGHT11J"; DISK ----- 02
A7 1470 FL$="" 7D 1890 PRINT"HOME,DOWN,BLACK, 63
A5 1480 GETAS:IFAS=""THEN1480 RVSONJTAPE OR DISK:[SPC27J";
41 1490 L=LEN(FL$) 8B 1900 IFDU=1THENPRINT"HOME,D CA
E5 1500 IFAS=CHR$(20)ANDL>OTHER OWN,RIGHT14JTAPE[SPC22J";
1530 72 1910 IFDU=8THENPRINT"HOME,D 2D
32 1510 IFAS="CCLRJ"THEN1460 OWN,RIGHT14JDISK[SPC22J";
FD 1520 GOTO1550 CS 1920 POKE198,0:WAIT198,1:GET 0C
1A 1530 FL$=LEFT$(FL$,L-1):PRIN AS
T"LEFTJ LEFTJ"; A9 1930 IFAS="T"ANDDU=8THENPRIN 6C
8B 1540 GOTO1480 T"HOME,DOWN,RIGHT14,RVSONJT
9B 1550 IFAS=CHR$(13)ANDL>OTHER APE":DU=1 04
1610 56 1940 IFAS="D"ANDDU=1THENPRIN
DB 1560 IFAS=CHR$(32)THEN1580 T"HOME,DOWN,RIGHT14,RVSONJD C4
C3 1570 IFASC(AS)<32ORASC(AS)>9 ISK":DU=8
OTHER1480 DB 1950 IFAS=CHR$(13)THENRETURN E9
70 1580 IF L=16THEN1480 DB 1955 IFAS=CHR$(32)THENRETURN
FD 1590 PRINTAS; 90 1960 GOTO1920 23
A7 1600 FL$=FL$+AS:GOTO1480 DS 1970 PRINT"HOMEJ";:FORA=1TO
39 1610 FORX=1TOLEN(FL$):POKE83 4:PRINT"[SPC40J";:NEXT
2+X,ASC(MID$(FL$,X,1)):NEXT 9F 1980 REM ----- PRINT CHECK
21 1620 POKE183,L SUM ----- 6C
EA 1630 RETURN D1 1990 CH=0:A=KB-B:FORX=1TO8 6A
6A 1640 REM ----- LOAD - 6E
----- 6D
E7 1650 GOSUB1970:GOSUB1890:GOS 2005 CH=CH+PC B3
UB1460 A2 2010 CH=CH-INT(CH/256)*256
2C 1660 IFDU=1THENPRINT"HOME,D AE 2020 DE=CH:GOSUB1110:CH$=MID
OWN,BLACK,RVSONJ PLACE TAPE $(HH$,3):RETURN
IN DECK THEN PRESS 'PLAY' E2 2030 REM ----- CHECKSUM ER
[C5]:GOTO1720 ROR ----- 76
23 1670 PRINT"HOME,DOWN,BLACK, EO 2040 PRINT"HOME,BLACK,RVSO
RVSONJ PLACE DISK INTO DRIVE F,C40J";
THEN HIT RETURN [C5]" 77 2050 PRINT"[RVSONJINPUT ERRO
F4 1680 POKE198,0:WAIT198,1:GET R - RE-ENTER [WHITEJ[BLACKJ
AS:IFAS<>CHR$(13)THEN1680 INE OR [WHITEJCC[BLACKJHECKSU
FS 1690 PRINT"HOME,DOWN,BLACK, M ";
RVSONJLOADING[SPC33J" AF 2060 PRINT"[RVSONJINPUT ERRO
1D 1700 PRINT"[RVSON,UP3,RIGHTB 16 2070 GOSUB2560
J";FL$ SF 2080 GETAS:IFAS=""THEN2080
EF 1710 SYS49244:GOTO1730 C2 2090 IFAS="L"THENQQ=1
DD 1720 SYS49152 F6 2100 IFAS="C"THENQQ=2
E5 1730 A=PEEK(829):B=PEEK(830) 13 2105 IFAS<>"C"ANDAS<>"L"THEN
:C=PEEK(831):D=PEEK(832) 2080
AB 1740 SA=(256*B)+A:CA=(256*D) D7 2160 PRINT"HOMEJ";:FORA=1TO
+C:S2=CA-SA:BU=BU+S2 3:PRINT"[SPC40J";:NEXT
DF 1745 DE=CA-1:GOSUB1110:CA$=L OC 2170 RETURN
EFT$(S0000",S-LEN(HH$))+HH$ BO 2180 I=49152
52 1750 RETURN A9 2185 PRINT"CCLR,DOWN10,RIGHT
47 1760 REM ----- SAVE - 7JPLEASE WAIT ONE MOMENT....
----- D4
12 1770 IFCA=SA THENRETURN AB 2186 PRINT"HOME,DOWN11,RIGH
69 1780 GOSUB1970:GOSUB1890:GOS AA 2190 READ A:IF A=256 THEN RE
UB1460 TURN 25
76 1790 A=SA-INT(SA/256)*256:B= EB 2200 POKE I,A:I=I+1:GOTO 219
INT(SA/256):POKE829,A:POKE83 0
O,B

```


Superbowl Sunday

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Study the two pictures on this page. There are several differences between them. Mark the differences which you can find and then fill in the coupon. Please write the number of differences which you have found on the back of your envelope, if you forget to do this, your entry will be void.

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WIMPS and Much More

*For those of you who found our WIMP Program useful,
here are a couple of additions to make it easier and
more enjoyable.*

By Allen Webb

Ease of use is often a major factor taken into consideration by programmers when they are summing up a program's usefulness. This is why I have decided to provide this addition to the Wimp program which appeared in the December 1986 issue of *Your Commodore*.

After writing the demonstration routine, I felt that, whilst it was instructive, it didn't give you anything to work from. I have therefore prepared a universal menu routine to use with the package. This routine is given in Listing 1.

The meat of the routine occupies lines 60000 onwards. To use the routine you must first pass the following parameters:

ME\$: MENU STRING
MW: MENU WIDTH
MH: TOTAL MENU HEIGHT
XL: X COORDINATE TOP LEFT CORNER
YL: Y COORDINATE TOP LEFT CORNER+1
C1,C2: MENU COLOURS

The routine will then draw the menu and set up the pointer. The routine detects the movement of the pointer and highlights the menu options or "last page" icon when they are pointed at. The button press is detected if an option has been selected and the routine exits with the following information:

TASK=OPTION SELECTED
LP=0 IF MENU ITEM
LP=1 IF LAST PAGE

You can use the values of TASK and LP to direct the logic of the rest of your program.

Input Instructions

The idea of this series is to provide a set of routines which can be used in more serious applications to reduce the toil of programming.

One pain in the neck is the INPUT instruction. Most software requires the input of information and it is of essence that such operations are both user friendly and idiot-proof. The Basic INPUT has several drawbacks and is not suitable for serious software. Many programmers use either GET or INPUT using a logical file opened to the screen.

It becomes particularly irritating if you want to limit the characters to be accepted. For example, what if you want to prompt for a response using only Y or N? One way is the routine:

```
10 GET I$: IF I$ < > "Y" OR
I$ < > "N" THEN 10
20 IF I$="Y" THEN...
```

This is simple enough but if you want to accept a larger group of

characters, the routine becomes messy.

The use of a user defined input routine appeared to be the answer. Such a routine should have the following features:

- 1) The routine should provide a flashing prompt, easily placed at a specified screen position.
- 2) A list of acceptable characters should be easily set up.
- 3) The routine should image the input to screen to allow the user to see what has been input. The ability to delete incorrect characters should be available.
- 4) The input should be easily limited to a specified length. The input should ignore the screen contents. These will allow the use of formatted displays.
- 5) The input should be returned in a specific string variable.
- 6) The routine should ignore a null input.

Such a routine is given in Listing 2. This routine provides all of the features described (the DEL key is used to correct inputs).

This routine has a rather peculiar syntax:

```
SYS 12*4096,B$,A$,X,Y,IL
```

where:

B\$: string to hold input
A\$: string specifying acceptable



characters

X: X coordinate of input prompt

Y: Y coordinate of input prompt

IL: length of input

Listing 3

```
100 A$="ABCDEFGHIJKLMNOPQRSTUVWXYZ
QRSTU VWXYZ "
110 A$=A$+"0123456789+-*!/$%"
130 IL=10:B$=""FOR I=1 TO IL:B$=
B$+CHR$(32):NEXT I
140 SYS12*4096,B$,A$,0,10,IL
150 PRINTCHR$(14)B$
160 GET$:IFIS="" THEN 160
```

In Listing 3 lines 100 and 110 set up the list of acceptable characters in A\$. The input length is limited to 10 in line 20 (variable IL). B\$ is set up with 10 spaces. This string will hold the input and must clearly be long enough to hold the fill input. Line 140 gets the input with a prompt at the start of line IL.

The routine will put the input at the place where B\$ is defined. If, for example, you replaced line 130 with:

```
130 IL=10:B$=" [5SPC]
```

If, after using the routine, you were to list the program, you would find that line 130 had been altered. The reason is that if a string is defined in a program, then Basic doesn't bother setting up the string elsewhere. Using the form given in Listing 3 forces Basic to set up the variable B\$ and therefore prevents corruption of the program.

Listing 4 gives a demonstration of a simple menu requiring a single key input. It should show how easy the routine is to use.

Listing 4

```
100 A$="DEISP"
110 IL=1:B$=CHR$(32)
130 PRINTCHR$(147)CHR$(17)
TAB(16)"MAIN MENU"
140 PRINTCHR$(17)TAB(14)"I..
INITIALISE"
150 PRINTCHR$(17)TAB(14)"E..
ENTER RECORD"
160 PRINTCHR$(17)TAB(14)"D..
DELETE RECORD"
170 PRINTCHR$(17)TAB(14)"S..
SEARCH"
180 PRINTCHR$(17)TAB(14)"P..
PRINT REPORT"
190 PRINTCHR$(17)CHR$(17)TAB
(7)"SELECT OPTION BY ENTER-
ING"
```

200 PRINTTAB(7)"INDICATED
KEY & PRESSING"

210 PRINTTAB(7)"RETURN"

2000 SYS12*4096,B\$,A\$,14,16,IL

2010 PRINTCHR\$(17)TAB(13)
CHR\$(18)B\$ " WAS SELECTED"

PROGRAM: LISTING 1

```
84 1 REM *****
CE 2 REM * LISTING 1 *
7A 3 REM *****
A0 10 SA=12*4096
CB 20 SYS SA+21,53248: REM UPPER
CASE
51 30 SYS SA+27: REM DEFAULT SCR
EEN
7A 40 AS="UNIVERSAL MENU ROUTINE
":SYS SA+39,A$,1,7,0,0:SYSSA+
48
1F 50 MW=14:MH=6:XL=4:YL=5:XR=(X
L-1)+MW:YR=YL+(MH-3):C1=2:C2=
10
DA 60 MES="CCA,S*12,CS)"
9B 70 MES=MES+"CS-] OPTION 1 [
S-2] OPTION 2 [S-2] OPTION
3 [S-2,SPC4]EXIT[SPC4,S-]
OC 80 MES=MES+"CZ,S*12,CX)"
FF 100 REM*****
*****
BC 110 REM ENTER WITH MES=MENU S
TRING
A1 120 REM MW=MENU WIDTH
71 130 REM MH=TOTAL MENU HEIGHT
31 140 REM XL=X COORDINATE TOL L
EFT CORNER
E5 150 REM YL=Y COORDINATE TOL L
EFT CORNER+1
A7 160 REM C1,C2= MENU COLOURS
FD 170 REM EXIT WITH TASK=OPTION
SELECTED
3D 180 REM LP=0 IF MENU ITEM, LP
=1 IF LAST PAGE
71 190 REM*****
*****
7B 200 GOSUB60000
OC 210 IF LP=1 THEN 30
43 220 IF TASK<>4 THEN 200
BE 230 PRINTCHR$(147):SYSSA+60:S
YSSA+9:END
FF 60000 SYS SA+54,MES,YL-1,XL,M
W,0,0,C1,C2: RF=0:LP=0:FL=0
BC 60010 SYS SA+48
B7 60020 SYS SA+57,1,11:POKE86B,
15
FD 60030 ROW=869: COL=870: SYS S
A+15,C1,C2
13 60040 IF PEEK(86B)=0 AND ((RF
>0) OR (FL>0)) THEN 60170
D7 60050 XC=PEEK(COL): YC=PEEK(R
OW)
DB 60060 IF (XC<XL) OR (XC>XR) O
R (YC<YL) OR (YC>YR) THEN 601
10
AB 60070 IF RF=YC THEN 60040
FD 60080 IF RF<>0 THEN SYS SA+42
,XL,RF,MW,1,2
9B 60090 RF=YC: SYS SA+42,XL,RF,
MW,1,2
F5 60100 GOTO 60040
40 60110 IF (XC>36) AND (YC>=0)
AND (YC<2) THEN 60150
62 60120 IF FL=1 THEN FL=0: SYS
SA+15,11,15: SYS SA+42,37,0,2
,2,2: SYS SA+15,C1,C2
4C 60130 IF RF=0 THEN 60040
3A 60140 SYS SA+42,XL,RF,MW,1,2:
RF=0:GOTO 60040
3C 60150 IF FL=0 THEN FL=1: SYS
SA+15,11,15: SYS SA+42,37,0,2
,2,2: SYS SA+15,C1,C2
1C 60160 GOTO 60040
```

That's all for this month. I haven't decided what to tackle next time but I'll think of something. Don't forget, let me have your comments (preferably no abusive) and suggestions via the editor. YC

```
73 60170 IF FL=1 THEN FL=0: GOTO
60190
49 60180 TASK=RF-YL+1: RETURN
F0 60190 LP=1: RETURN
```

PROGRAM: LISTING 2

```
C3 2000 FOR L=0 TO 19: CX=0: FORD=0 TO
15: READA: CX=CX+A: POKE49152+L*
16+0,A: NEXT L
B2 2010 READA: IFA<>CX THEN PRINT "E
RROR IN LINE": 2040+(L*10): STO
P
OF 2020 NEXT L: END
75 2040 DATA160,100,169,32,153,6
2,3,136,208,250,32,169,192,16
5,34,133,1998
E8 2050 DATA170,165,35,133,171,3
2,169,192,32,182,192,32,191,1
92,165,20,2073
9F 2060 DATA141,231,3,32,191,192
,165,20,141,230,3,32,191,192,
165,20,1949
B4 2070 DATA141,228,3,32,201,192
,160,0,140,229,3,32,228,255,2
08,12,2064
C3 2080 DATA172,229,3,32,8,193,3
2,8,193,76,59,192,201,13,240,
68,1719
FB 2090 DATA201,20,208,18,172,22
9,3,192,0,240,224,136,206,229
,3,169,2250
B1 2100 DATA32,145,253,76,59,192
,172,229,3,204,228,3,240,205,
160,0,2201
AB 2110 DATA209,251,240,9,200,20
4,232,3,208,246,76,59,192,172
,229,3,2533
53 2120 DATA153,62,3,32,40,193,1
45,253,204,228,3,240,174,200,
238,229,2397
BC 2130 DATA3,76,59,192,172,229,
3,240,162,160,0,185,62,3,145,
170,1861
54 2140 DATA204,229,3,240,3,200,
208,243,96,32,253,174,32,158,
173,32,2280
1C 2150 DATA165,182,141,232,3,96
,165,34,133,251,165,35,133,25
2,96,32,2116
CB 2160 DATA253,174,32,138,173,3
2,247,183,96,169,4,133,254,16
9,0,133,2190
A3 2170 DATA253,172,230,3,192,0,
240,16,24,165,253,105,40,133,
253,165,2244
56 2180 DATA254,105,0,133,254,13
6,208,240,24,165,253,109,231,
3,133,253,2501
D0 2190 DATA165,254,105,0,133,25
4,96,140,132,3,160,100,162,10
0,202,208,2214
59 2200 DATA253,136,208,249,172,
132,3,96,172,229,3,177,253,14
1,61,3,2287
7E 2210 DATA44,61,3,16,9,177,253
,41,127,145,253,76,36,193,177
,253,1864
8D 2220 DATA9,128,145,253,32,247
,182,96,201,64,176,1,96,201,1
27,176,2144
5F 2230 DATA4,56,233,64,96,56,23
3,128,76,255,64,255,64,255,64
,191,2114
```




Listings

*Get it right first time with our deluxe program system
for the C64.*

You may have noticed that our listings are free of those horrible little black blobs which send you searching around the keyboard for a suitable graphic symbol. You may also have noticed the funny numbers by the side of each line of the listing. Fret no more, it's all part of our easy entry aid.

Instead of those nasty graphics and rows of countless spaces in PRINT statements and strings we use a special coding system. The code, or mnemonic, is always contained in square brackets and you'll soon learn to decipher their meanings.

For example, [SA] would mean type in a Shifted A, or an ace of spades in layman's terms, and [SA10] would mean a row of ten of these symbols.

[S+2] means hold down the shift key and press the plus key twice. It doesn't take a great leap of logic to realise that [C+2] means exactly the same thing except that the Commodore key (bottom left of the keyboard) is held down instead of the shift key.

If more than two spaces appear in a statement then this will be printed as [SPC4] or, exceptionally, [SSPC4]. Translated into English this means press the spacebar four times or in the latter case hold the shift key down while you do it.

A string of special characters could appear as:
[CTRL N, DOWN2, LEFT5, BLUE, F3, C3]

This would be achieved by holding

down the CTRL key as you press N, press the cursor key down twice, the cursor left key five times, press the key marked BLUE while holding down the CTRL key, press the F3 key and, finally hold the Commodore key down while pressing the number two key (C2 would of course make the computer print in brown).

Always remember that you should only have a row of graphics characters on your screen with no square brackets and no commas, unless something like this appears:

[SS],[C*]

In this case the two characters should have a comma between them.

On rare occasions [REV T] will appear in a listing. This is a delete symbol and is created by entering the line up to this mnemonic. Then type a closing quotation mark (SHIFT & 2) and delete it. This gets the computer out of quotes mode. Hold down CTRL and press the number nine key (RVSON), type the relevant number of reversed T's and then hold down CTRL and press zero (RVSOFF). Next type another quotation mark and delete it again. Now finish the line and press RETURN.

A list of these special cases is given in the table but remember that only one of these mnemonics will appear outside of a PRINT string: the symbol for pi. This may appear when its value is needed in a calculation so this may look something like:

:CC=2*[PI]*R:

Ignore the square brackets and just type in a shifted upward pointing arrow (ie. the pi symbol).

PROGRAM: SYNTAX CHECKER

5 REM SYNTAX CHECKER - ERIC DOYLE

10 BL=10 :LN=70 :SA=49152
20 FOR L=0 TO BL:CX=0:FOR D=0 TO 15

30 READ A:IF A>255THENPRINT"NUMBER TO LARGE":LN+(L*10):STOP
40 CX=CX+A:POKE SA+L*16+D,A:NEXT D

50 READ A:IF A<CX THENPRINT"ERROR IN LINE":LN+(L*10):STOP

60 NEXT L:SYS 49152:NEW
70 DATA 173,5,3,201,165,208,31,1
20,169,9,141,32,208,141,33,208,1
847

80 DATA 169,7,141,134,2,169,13,3
2,210,255,169,64,141,4,3,169,168
2

90 DATA 192,141,5,3,88,96,120,16
9,124,141,4,3,169,165,141,5,1566

100 DATA 3,169,14,141,134,2,141,
32,208,169,6,141,33,208,88,96,15
85

110 DATA 32,124,165,72,138,72,15
2,72,162,0,165,20,133,254,165,21
1747

120 DATA 24,101,254,133,254,189,
0,2,240,18,69,254,133,254,232,18
9,2346

130 DATA 0,2,240,8,24,101,254,13
3,254,232,208,233,169,1,141,134,
2134

140 DATA 2,165,254,74,74,74,74,3
2,156,192,32,210,255,165,254,41,
2054

150 DATA 15,32,156,192,32,210,25
5,169,13,32,210,255,169,13,32,21
0,1995

160 DATA 255,169,7,141,134,2,104
168,104,170,104,96,24,105,48,20
1,1832

170 DATA 58,16,1,96,24,105,7,96,
0,0,0,0,0,0,0,0,403

by Eric Doyle

Checksum Program

The hexadecimal numbers appearing in a column to the left of the listing should not be typed in with the program. These are merely checksum values and are there to help you get each line right. Don't worry if you don't understand the hexadecimal system, as long as you can compare two characters on the screen with the corresponding two characters in the magazine you can use our line checking program.

Type in the Checksum Program, make sure that you've not made any mistakes and save it to tape or disk

immediately because it will be used with most of the present and future listings appearing in Your Commodore.

At the start of each programming session, load Checksum and run it. The screen will turn brown with yellow characters and each time you type in a line and press the RETURN key a number will appear on the screen in white. This should be the same as the corresponding value in the magazine.

If the two values don't relate to one another, you have not copied the line exactly as printed so go back and check each character carefully. When you find the error simply correct it and

















press RETURN again.

If you want to turn off the checker simply type SYS49152 and the screen will return to the familiar blue colours. You can then do whatever it was you wanted to do and if this doesn't use the area where Checksum lies you can go back to it with the same SYS command.

















No system is foolproof but the chances of two errors cancelling one another out are so remote that we believe our listings are more reliable than any other magazine in the world. So get typing!

VC

Mnemonic Symbol Keypress

[RIGHT]		CRSR left/right
[LEFT]		SHIFT & CRSR left/right
[DOWN]		CRSR up/down
[UP]		SHIFT & CRSR up/down
[F1]		f1 key
[F2]		SHIFT & f1 key
[F3]		f3 key
[F4]		SHIFT & f3 key
[F5]		f5 key
[F6]		SHIFT & f5 key
[F7]		f7 key
[F8]		SHIFT & f7 key
[HOME]		CLR/HOME
[CLR]		SHIFT & CLR/HOME
[RVSON]		CTRL & 9
[RVSOFF]		CTRL & 0

Mnemonic Symbol Keypress

[BLACK]		CTRL & 1
[WHITE]		CTRL & 2
[RED]		CTRL & 3
[CYAN]		CTRL & 4
[PURPLE]		CTRL & 5
[GREEN]		CTRL & 6
[BLUE]		CTRL & 7
[YELLOW]		CTRL & 8
[POUND]		£
[LAWROW]		←
[UPARROW]		↑
[PI]		SHIFT & ↑
[INST]		SHIFT & INST/DEL
[REV T]		see text
[Cletter]		CBM + letter
[Sletter]		SHIFT + letter

Software for sale

If you think that one of our programs looks very interesting, but you can't afford the time to type it in then our software service will help you out.

It's three o'clock in the morning. You sit at the computer keyboard just finished a marathon typing session entering one of the superb programs from *Your Commodore*. Your fingers reach for the keyboard and press the letters R, U and N. You press RETURN, sit back and nothing happens.

Everyone has probably faced this problem. When it does happen it's a matter of spending hours searching through the program for any typing mistakes. No matter how long you look or how many people help you, you can usually guarantee that at least one little bug slips through unnoticed.

The *Your Commodore* Software Service makes available all of the programs from each issue on both cassette and disk at a price of £6.00 for disk and £4.00 for cassette. None of the documentation for the programs is supplied with the software since it is all available in the relevant magazine. Should you not have the magazine then back issues are available from the following address:

INFONET LTD, Times House, 179 The Marlowes, Hemel Hempstead, Herts. HP1 1BB.
TEL: (0442) 48435

please contact this address for prices and availability.

The Disk

Programs on the disk will also be supplied as totally working versions, i.e. when possible we will not use Basic Loaders thus making use of the programs much easier. Unfortunately at the moment we cannot duplicate C16 and Plus/4 cassettes. However programs for these machines will be available on the disk.

What programs are available?

At the top of each article you will find a strap containing the article type, C64 Program etc. So that you can see which programs are available on which format you will also find a couple of symbols after this strap. The symbols have the following meaning:



This symbol means that the program is available on cassette.



These programs are available on disk.

Please Note

Since the programs supplied on cassette are total working versions of the program, we do not put disk only programs on tape. There is no sense in placing a program that expects to be reading from disk on to tape.

OCTOBER 1986

CROSSWORD — Pit your wits against your computer.

POP UP MENUS — A superb routine that allows you to add pop-up menus to your C64.

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ORDER CODE

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TAPE YCOCT86 £4.00

NOVEMBER 1986

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SELECT MENU 128 - Add a menu program to your C128 disk collection.

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ORDER CODE

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Cassettes or disks are available back to March 1986. Please ring the Editorial office (01-437-0626) for details of these.

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CP/M: The Third Facet of the 128

The C128 has three modes – 64, 128 and the much neglected CP/M. In this article we bring you a pocket guide to CP/M and shed light on its uses.

By Mycroftt Appleby

The Commodore 128 comes with CP/M+ as the operating system for the built in Z80 second processor. However, the documentation is sparse and confusing, and information on the supplied utility software is rare. Read on and, you may hear something to your advantage.

CP/M started life as a monitor for the newly introduced Intel 8080 processor evaluation kit and was written by one of its employees. CP/M in those days (c1973) stood for Control Program/Monitor. This monitor handled things like the paper tape reader and writer, punched cards, and a line printer, as well as the teletype console to which it was attached.

After a short while, Shugart came on the scene. Shugart had just developed the mini disk drive by shrinking the normal eight inch IBM drives down to a handier five inch size. The problem was that they had no real software to make them work. So Shugart asked the chap who wrote CP/M if he could do something with them and make the whole system work together. This was duly done, and the early CP/M had taken shape.

Intel however, didn't want to market this program, so the chap left

Intel, worked all the bugs in the program out, set up his own company, and CP/M 1.4 was launched on an unsuspecting public.

The company started out life called Intergalactic Digital Research, but a bank manager probably talked them into dropping the 'Intergalactic'! CP/M was further refined into CP/M 2.2 and the 'standard' CP/M system was defined as a Z80 processor, 64K of memory, between one and eight disk drives, and an 80 x 25 screen. As long as your system had these minimums, software would run. This held immense attractiveness for software houses as instead of writing dozens of different versions of a program for all the different machines, they could just write a CP/M program and put a little program on the same disk that would ask the user to describe what was different about the CP/M system from everybody else's, and you're away.

At about this time CP/M was deemed to mean 'Control Program/Microcomputers', as it was though that reminding people that this program was just an easy way to hook up paper tube punchers to 8080 development systems (a development system looks like a circuit board, with

a calculator display and a small keypad – that's it!) would just confuse them – they were probably right, though when you know that, it explains a lot of things!

In around 1980 memory was getting a bit cheaper and all sorts of bodes were being used to get more memory into CP/M systems than the 64K allowed for (64K in 1973 was uncomprehendingly huge). So Digital Research wrote CP/M 3.0, CP/M+ to cater for it. Up until now CP/M contained a number of components. A boot-ROM that loaded CP/M off disk and into memory. BIOS or Basic Input/Output System to handle the paper tape/keyboard/printer etc. a BDOS to handle the disks, and the CCP – or Console Command Processor, which actually does all the donkey work. All these together take up about 12K – though this can vary depending on the machine. Take out the screen and a small area for variables and the TPA or Transition Program Area (the place in memory that the programs actually get loaded into) starts to shrink. So even with 40K TPA, running a business program may only give you 10K to play around with – not a lot at all.



What CP/M+ does is to allow the Z80 to have 128K in a banked system. This puts the screen, BIOS, BDOS, CCP, and RSXs (more of these later) out of the way, and leaves TPA of around 60K. This still may not sound a lot, but applications programs can also use the banked memory – so you may still have around 59K to play around with for data, – a much better state of affairs. DR also took the opportunity to 'clean up' some of the dodgier bad points of CP/M 2.2 and make it work a lot more user – friendly. CP/M+ also uses RSXs more efficiently by storing them out of the way when the main program is working, what's an RSX? It's a Resident System Extension. This will expand the capabilities of CP/M in some way. It is mainly used for the GSX system which is a logical, machine independent way of handling graphics.

DR also launched a number of new products at this time – CP/Net for networks, MP/M – for multi user applications, and Personal CP/M – for smaller machines without disk drives. However, their drive for world dominance in the business operating system market was killed stone dead in a couple of months by the emergence of the IBM PC and its operating system called MS-DOS – written by DR's arch rivals Microsoft (who started in a very similar way to DR, except that they were called The Kentucky Fried Software Company, and began by writing a program called Basic – but that's another story!). MS-DOS was written from scratch as a 'real' operating system, and not as a hex monitor, and

it showed. It was friendly, fast, (relatively) bug-free, and could access 640K of memory. Business men flocked to it in droves. DR eventually recovered with a program called GEM (Graphics Environment Manager), but that's also another story!

The C128 and CP/M

Most people know that a C128 has two processors a Z80 and an 8502. Both can have access to the 128K of main memory, and both can have access to the 16K of video memory (yes, that's right – your C128 is actually a C144, but that would probably only confuse people). What most people don't realise is that the Z80 is the main processor and has priority, and that the 8502 is actually the second processor! When you turn on a C128 (with a disk drive attached) the disk whirrs. This is the CP/M boot ROM trying to load CP/M off disk. If it doesn't manage it, it gives up and grudgingly lets the 8502 have its evil way.

Remembering what I said about the minimum system configuration for CP/M I will assume that you are using a C128 with at least one disk drive, and the 80 column screen facility. You can use the 40 column screen, but this is a window on a logical 80 column screen – much better to use the real thing – also as the 80 column screen has its own 16K memory, you don't lose the odd couple of K here and there.

So pop in your system disk (that with CP/M on it) grind your C128 screaming and kicking into life and hey presto! Nothing particularly exciting

happens at all! In fact all you get is a version number, a copyright message, a TPA size, and the letter 'A' followed by a little prompt '>'. Fantastic! Stupendous! Incredible! What happens next? Who cares?

But What does it do?

When you see the prompt, it is telling you three things. Firstly, that the drive you are using is drive A. That you are logged on as user zero, and that the CCP is waiting for input from you. What do these terms mean? Well, CP/M drives are designated by letters from A to P, and you have a drive that all disk operations happen to unless you specify a different one. This is called the default drive. In CP/M the default drive always starts off as 'A'. In the CP/M disk system on the C128 the attached disk drive is always 'A', but it also has a 'RAM Disk' assigned to 'E', this is an area of memory that behaves just like a disk drive. This is to help you with disk copying etc. More about this later.

The user number is a way of keeping 16 different directories on the disk at once. Perhaps you will have WP files on one, Basic programs on another, and a database on another one. These are called User numbers and can be from zero to 15. Like the default drive, CP/M has a default User number. This starts off as zero. If the user number is changed to get at another directory, you will still be able to get at User zero, this works like a global directory that can be accessed by all the others.

If you change the default drive then the display may look like this 'B>' - indicating drive B, and if you change the User number it could look like this '4C>' - indicating User four.

Now the CP/M system is waiting for your input. This is very much similar to the Basic 'Ready' prompt. It means that the current operation is finished and it is waiting for a new one. From here you can type in commands to make CP/M do things.

In CP/M there are two types of command - resident and transient. Resident commands are the ones built into the system. Transient commands are loaded off disk before they are executed. It is these transient commands that take up most of the CP/M system disk.

So, What Happens Next?

The resident commands are fairly simple and are detailed as follows. You can change the default drive by typing in the new letter followed by a colon. So to change to drive 'C' you would type in 'C:'. User numbers can be changed by typing in 'USER n', where 'n' is the new number. DIR displays a directory of disk contents, sorted into alphabetical order, following it with a drive letter and a colon will directory that drive. No letter and the default drive gets it. REN will rename a file. ERA will erase a named file. TYPE will display a named text file on the screen. And DIRSYS will display the system files in a similar manner to DIR. System files are files that are usually loaded in when CP/M is booted and do not normally appear in the directory. This command forces them to be displayed.

These commands also have transient versions. These are extended versions of the commands, whilst due to memory space the built in commands perform only the basest function. Remember that these commands must be present on a disk in the drive for them to function.

DIR, DIRSYS commands can now have a filespec after them using the CP/M wild card system. This wild card system is identical to the Commodore one. In that a '?' stands for any letter, and a '*' stands for anything else in the filename - but remember the file extension that must be specified in all CP/M operations (similar to the PRG, SEQ, USR labels on Commodore drives). So

typing in 'DIR FRED*.*' will list all files beginning with 'FRED', or 'DIR *.COM' will list all command files. Including a drive letter followed by a colon before the filespec will direct CP/Ms interest to that drive. Hence 'DIR B:*.BAK' will list all backup files on drive B. You can use multiple filespecs.

You may also include an options list after the filespec. The options list is a list of commands enclosed in square brackets and separated by commas. These tell CP/M that something out of the ordinary is to be done with the directory listing. Options are as follows:

ATT - Displays user defined file attributes (don't worry about this - it's of absolutely no use what so ever.)
DATE - Displays the date and time that the file was last changed. Date stamping must have been initialised previously though.

DIR - Only displays files that have the 'DIR' attribute.

DISK=ALL, DRIVE=ALL - (either will do) Displays files on all available drives.

DRIVE=(A,B,C) - Displays directory from specified drives only.

DRIVE=A - Only from drive specified.

EXCLUDE - Displays all files except the files specified.

FF - Sends a form feed before listing out the directory. Only really used for printers.

FULL - Displays masses of status information about the file as it is displayed - how long in Kilobytes, how many 128 byte records it takes up, the password protection mode, and the date/time stamps.

LENGTH=x - Outputs 'x' blank lines before printing the directory, mainly used for printers again.

MESSAGE - Give out status information as CP/M searches various drives etc. Gives you something to watch whilst it's all happening.

NOPAGE - Overrides the CP/M+ paging system.

NOSORT - Displays files in the order that they are found rather than alphabetically sorting them.

RO - Displays only files that have the read only attribute set.

RW - Displays only files with the read/write attribute set.

SIZE - Shows the length in K of the files.

SYS - Displays only system files.

USER=ALL, USER=n, USER=(0,1,2) - Similar functions to 'DRIVE' except

refer to the 16 user numbers.

Device indirection is a very clever piece of software. Say you wanted the RS232 interface to be your printer output rather than the normal printer. What you can then do is to set the printer output to the RS232 interface. simple. But, how do you do it?

As well as all these logical devices CP/M also has physical devices. These are:

CRT - Screen.

CRT2 - Keyboard.

LPT - Printer.

IOS - RS232.

NULL - Nothing (used for turning something off).

To alter the direction of something you simply assign it, to take our example earlier: 'DEVICE LST:=IOS:'. This will set up the default printer output to go to the RS232.

Almost any device can be assigned to any other device with a few exceptions that are handled by the transient commands GET and PUT. So you could quite easily attach a terminal to the computer, type in 'DEVICE CON:=IOS:'. And the computer suddenly being operated by remote control. 'DEVICE CON:=CRT' will change it back to normal.

You can also change options on the devices with this command. Changing the screen has been discussed earlier. But as far as the RS232 interface is concerned DEVICE AUXIN:[XON 600] will set the RS232 interface input to the xon protocol and 600 baud. Various baud rates are accepted and XON/NOXON controls the hand shaking. These options can be included in the same statement as the assignment, and multiple assignments are also allowed. So 'DEVICE LST:=IOS:[NOXON,19200],CON:=CRT' is acceptable.

FORMAT - Is the transient command to format a CP/M disk prior to use. Type in 'FORMAT' and then follow instructions.

INITDIR - This command reorganizes the disk directory slightly to allow date/time stamping. This is so that whenever a file is written to, the time and date when this happens is recorded - but remember to set the date using the DATE command or the system will use the date when CP/M was written!

SAVE - Will save a program from memory to disk - not for the unwary.

SET - This is a very powerful command

mand that lets you set a number of attributes for a file or group of files. The SET command basically works in three ways. The first is just setting the attributes as mentioned before. 'SET *.BAK[RO,SYS]' will change all backup files to read only and system files. This can be used with any of the RO,RW,SYS,DIR attributes.

You may have noticed the word 'attributes' appearing above. This refers to certain characteristics that can be set in a file. RO and RW set the file to read only or read/write depending, and will prevent the modification of a file. SYS will turn a file into a system file, and DIR enables directory listing. These attributes will be discussed later in the 'SET' command which is the command used to change these.

The transient versions of ERA, TYPE, and REN are not nearly as complex as DIR. They merely allow the use of file space rather than discrete name. So 'ERA B:*.BAK' will erase all backup files on drive B. USER has no transient equivalent.

Now What?

Now the fun starts. On your system disk you will find a good few program names. Most of them are transient commands, but a lot of them are better considered as discrete programs.

First let us consider the 'quicky' commands. These are accessed in the same way as the resident commands, by just typing them in. The only difference is a slight delay before they take effect due to their being loaded off disk.

DATE - Sets or displays the date and time, used for date stamping of CP/M+ files when enabled (see INITDIR). To display the date use 'DATE', or to have a continuous display of date and time use 'DATE CONTINUOUS' or 'DATE C', to set the date use 'DATE SET'.

DUMP - Displays a hex dump of a named file.

GET - Gets console input from a disk file rather than from the keyboard. Rather like the BBC micro's 'EXEC' command.

PUT - Writes everything that would have gone to the screen into a disk file instead. Rather like 'SPOOL' on a BBC micro.

DEVICE - This command allows you to set or change physical and logical

devices around, and set the characteristics for those devices. Device names are three letters long with a trailing colon. They may also have the suffix 'IN' or 'OUT' to change only that characteristic.

CON: (CONIN:, CONOUT:) - is the console.

DEVICE CON:[COLUMNS=40, LINES=14] - will set the size of the screen.

DEVICE CON:[PAGE] - will display the current size.

AUX: (AUXIN:,AUXOUT:) - is the auxiliary in/out usually attached to the RS232 interface.

LIST: - is the printer output name. It has no options.

The second function changes the drive attribute and name. The drive attribute is either RW or RO, in normal operation it is RW 'SET A:[RO]' will stop you writing to that drive. In addition each disk can have a name conforming to the same rules as CP/M file names (i.e. eight letters a dot and three letters). 'SET A:[NAME=GAMES.001]' will label the disk with that name.

The last function is used with the passwords system that CP/M+ uses. Firstly you can assign a password to the entire disk. This will prevent anyone using the SET command on that disk at all. It takes the form 'SET [PASSWORD=melon]' where 'melon' is the password. To remove the password 'SET [PASSWORD=]' is needed. Note that you need the password to get that far, and that you don't need the trailing bracket - Return will do.

To enable password protection on the files on a disk, the password system must first be initialised. 'SET [PROTECT=ON]' will alter this.

To change or set the passwords the command takes on the syntax 'SET FRED*.* [PASSWORD=mike]' where mike is the password and FRED*.* refers to any normal filespec.

Passwords can also be selectively used on certain functions, these are READ, WRITE, DELETE, NONE. One of these functions can be selected, READ affects everything so that you need a password for almost every access of the file.

WRITE needs a password for writing, renaming, or deleting. This allows the file to be read but not tampered with.

DELETE allows you to do

anything to the file except delete it or rename it. NONE turns off the password protection. The syntax is 'SET WP.COM [PROTECT=READ]'.

Default passwords can also be selected. Say all the files on the disk had the password 'fred'. 'SET [DEFAULT=fred]' would remove the need to type in the password every time a file was accessed. Normally the password has to be included in the filespec after a trailing semi-colon. Say a file called 'private.doc' with a password of 'mike' was to be accessed, then the filespec would be 'private.doc;mike'.

The final function of the SET command is to alter the way that date stamping is used (assuming that date stamping has been initialised). The three options ACCESS, UPDATE, and CREATE are used. Access will stamp the file every time that you do anything with it, create only stamps it the first time you write it to disk, and update everytime that you alter the file. Create and Access are mutually exclusive and turning one on will turn the other one off. Syntax is 'SET [UPDATE=ON]'.

SHOW will display certain information about the disk depending on the option list given. SHOW on its own or with a drive name will give you the read/write space remaining. SHOW with an option after it will perform one of the following functions:

LABEL - Will show the disk name, whether the disk is password protected, the stamp create/update status, and the date that the disk name was created or updated.

USERS - Will list the active user numbers and their respective number of active files and free directory entries.

DIR - Displays the number of free directory entries.

DRIVE - Will output a comprehensive list of the characteristics of that drive.

So typing in 'SHOW A:[DIR]' will give you the number of free directory entries on drive A.

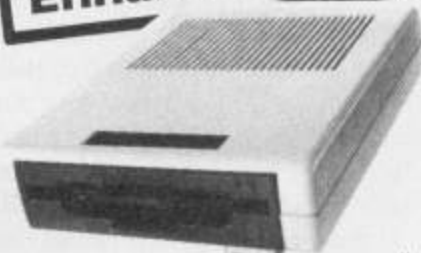
I think that wraps it up for this month. Next month I will be telling you about one or two special modifications made to the C128 version of CP/M like the virtual drive and the user defined keyboard. Also I will be detailing some of the really complicated commands, as well as explaining some of the more obscure concepts that CP/M uses. So if you are confused (I know I am!) all will be revealed next month.

YG

Evesham Micros

ALWAYS A STEP AHEAD

The EVESHAM Enhancer 2000



The Evesham Micros version of this reliable and compact disc drive has a **new ROM** to ensure a **very high** degree of compatibility with disc turbos and protection schemes.

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- ☆ NO OVERHEATING
- ☆ VERY RELIABLE
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- ☆ COMPACT SIZE
- ☆ HIGHLY COMPATIBLE
- ☆ VERY QUIET

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ONLY THE EVESHAM MICROS VERSION OF THIS DRIVE HAS THE NEW ROM THAT WILL HANDLE DISC TURBOS AND LOAD OVER 98% OF PROTECTION SCHEMES.

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YOU WON'T BELIEVE YOUR EYES

DOLPHIN DOS THE EFFECT IS STAGGERING.

Now established as **THE parallel operating system** for the 1541 disc drive. Hundreds of satisfied include business, hobby and full-time programmers **including the Gremlin Graphics team**. The and efficiency is truly unbelievable, it is compatible with the **vast majority of commercial software** speeding up both the loading of the program and of **SEQ/REL files**. (It is brilliant with Super Easyscript, etc.) For non-compatible programs it can be **completely switched out**. It DOES NOT special disc format and your existing discs will be compatible.

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Fitting involves the insertion of two sub assembly circuit boards, one in the 1541 and one in the '64. These normally just plug in but on some '64s a small amount of soldering is necessary.

SOME OF THE FEATURES

- ★ 25x FASTER LOADING (PRG FILES)
- ★ 12x FASTER SAVING (PRG FILES)
- ★ 10x FASTER LOADING (SEQ FILES)
- ★ 8x FASTER SAVING (SEQ FILES)
- ★ 3x FASTER LOAD/SAVE (REL FILES)
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- ★ USE 40 TRACKS FOR 749 BLOCKS
- ★ MONITOR BUILT IN
- ★ DRIVES CENTRONICS PRINTER
- ★ ENHANCED SCREEN EDITOR
- ★ EXTRA BASIC COMMANDS

(These figures do not allow for searching)

ONLY £69.95

Available for CBM 64 or '128 in '64 mode, please specify.

EXTRAS AVAILABLE

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|---|--------|
| Kernal for '128 in '128 mode | £9.95 |
| User port expansion card (3 slot) | £14.95 |
| Dolphin Copy (Whole disc in 18 secs and lightning fast file copier) | £7.95 |
| Dolphin main board for second drive c/w lead | £44.95 |

If you require further information please send SAE for fact sheet

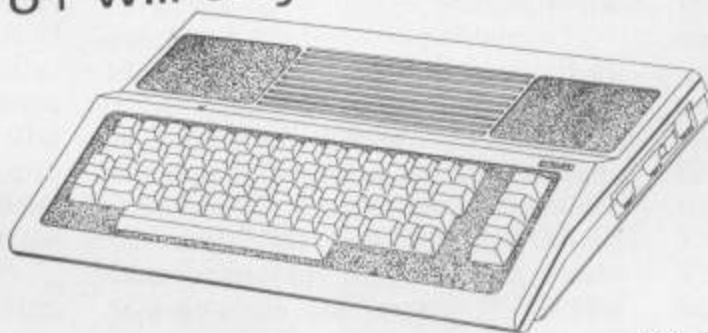
STOP PRESS

Dolphin DOS wins C.C.I. Oscar for best utility of 1986. First ever 100% hardware rating in Compunet review. Many more software houses now using D. DOS include: Superior, Alligata, Adventure International, Thalamus, and Domark.

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your new look '64 will only cost you **£19.95**

THE LO-LINE '64



This new stylish case with it's modern sleek style will transform your '64. The high quality injection moulding is beautifully finished and very sleek. The lower key height also makes operating the computer much more comfortable. It is very easy to transfer your '64 into this new case creating the feel of a new computer.

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After enjoying considerable success since its release have now made some improvements to "QUICKDISC" maintain its position as best value in the disc up/utility cartridges.

Fast LOAD (now 5-7 normal speed). Works majority of protected software be switched in and out from keyboard.

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Improved DOS commands (5.1) makes for easy use of the drive. eg. S(RETURN) will LOAD display a directory without writing BASIC. SHIFT RUN/STOP LOAD "0"*.B.1 etc. Very useful.

Incorporates Centronics printer software (user port) with CBM graphics capability (requires user port centronics cable).

A RESET switch is fitted. (We have found this to be "unstoppable" even preserves the tape buffer).

NO MEMORY IS USED by this cartridge, it is totally "transparent" and uses special switching techniques.

"128" and 1570 compatible '64 mode.

PLUS MANY MORE USEFUL FEATURES TO MAKE YOUR 1541 FAR MORE FRIENDLY TO OPERATE.

ONLY £19.95

NOW EVEN FASTER

FREEZE FRAME UTILITIES DISC V2.0

Now with **many more** routines to allow the complete transfer from tape to disc of programs that load parts as the program progresses. Used in conjunction with **Freeze Frame** for the awkward ones that cannot be handled by the standard cartridge. Included are routines for most popular games like **Supercycle, World Games, Gauntlet, Trivial Pursuit, Ace of Aces, Dragons Lair I & II** (includes training mode), etc., etc.,

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Update fees for owners of V1.0 is £2.00

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NEW
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VERSION



NOW HANDLES PROGRAMS THAT LOAD SUBSEQUENT PARTS

The world's most powerful backup product? We are sure that "Freeze Frame" is the most powerful and the easiest to use product of its kind. The originator and still the best. Now the "MK. IIIB" version has moved "Freeze Frame" well ahead of the "opposition". As well as its unflinching skill in handling **every memory resident program** available for testing up to 1st December 1986 it will now transfer from tape to disc the majority of programs that load subsequent parts (e.g. Winter Games, Silent Service, etc.).

- TAPE TO DISC
- DISC TO DISC
- COMPLETE SELF-CONTAINED, NO EXTRA SOFTWARE NEEDED
- FILES COMPRESSED FOR ECONOMY OF STORAGE SPACE
- 128/128D COMPATIBLE IN 64 MODE

FEATURES

- TAPE TO TAPE
- DISC TO TAPE
- RELOAD INDEPENDENT OF THE CARTRIDGE
- NOW HANDLES PROGRAMS THAT LOAD EXTRA PARTS
- PROGRAMS RESTART FROM THE POINT BUTTON IS PRESSED

SUPERB SELECTIVE FILE COPIER BUILT IN, WILL LOAD AND SAVE FILES UP TO 248 BLOCKS LONG AT HIGH SPEED

OPERATING "FREEZE FRAME"

"Freeze Frame" is **simplicity itself** to use. Just plug it in the cartridge port, switch on and select required option from the menu. You can then load and run software totally as normal. The latest version of "Freeze Frame" will, to the best of our knowledge, allow **ANY software** to load and run normally (unlike some competitive products).

"Freeze Frame" can be brought into operation at any convenient point by pressing the button on it. You can then do one of three things—

1. Pressing "D" will save a working version of the program in memory to a formatted disc. This version will include an auto booting very high speed reload (many programs reload in less than 30 secs).
2. Pressing "S" will save a completely standard version to disc, ideal for use with your fast load cartridge or system. Use with "Dolphin DOS" to load any program in 10-15 seconds. Also compatible with non CBM drives and U.S. spec. computers.
3. Pressing "T" will save a working version of the program in memory to tape. This incorporates a high speed reload at approx. 2400 baud.

IT'S AS SIMPLE AS THAT

ALL PROGRAMS SAVED WITH "FREEZE FRAME" CAN BE RELOADED INDEPENDENTLY OF THE CARTRIDGE

ONLY £39.95

Owners of earlier versions can return them and upgrade for £14.95
SERIOUS WARNING: THIS IS AN EXTREMELY POWERFUL PRODUCT AND IS STRICTLY FOR PERSONAL USE. DON'T COMPARE IT WITH ANY OTHER PRODUCT, NOTHING ELSE OFFERS THE POWER OF "FREEZE FRAME".

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SELECTED PRODUCTS

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Now the **FIFTH** generation of the countries leading disc backup/utility package is available. This latest version includes **many more "PARAMETERS"** to handle the latest highly protected discs. This includes the latest **American and English software.** Be warned if you want to back up software by Ocean, Gensin, Hewson, Domark and even U.S. Gold, whose protection schemes are NOT always the same as the American versions, then you **MUST** have "D.D.". At press date, we are sure **NO other advertised product will handle all these, be it American or German.**

INCLUDES THE FOLLOWING

"EVESHAM 3 MINUTE NIBBLER" is the latest version of the famous "Evisham Nibbler" now boasting **even more power and speed.** Copies highly protected discs in 3-4 minutes. Handles the latest types of disc protection completely automatically. This often involves the use of the "PARAMETERS", these add the vital secret code that the highly protected programs check for. (This is the important difference that makes this the best.) At the time of going to press this program copied **virtually all the English and American programs available for testing,** including the latest in games and business software.

"DUAL DRIVE NIBBLER" allows the use of two drives to make **even faster back ups.** Incorporates device number change software so no hardware mods necessary.

"EVESHAM 8 MINUTE NIBBLER" still very powerful and has been improved. Copies a few that the three minute version won't.

Many, many other useful utilities are included on the disc, including: **SELECTIVE MENU MAKER, FAST FORMAT, FAST FILE COPY, NOVATRANS, DISK ORDERLY, DISCMON+, UNSCRATCH, ETC., ETC.**

The whole package is menu driven and has its own fast boot system built in for your convenience. Pays for itself the first day you receive it.

ONLY £29.95

Customers with earlier versions may return them along with a payment of £9.95 to receive V5.0.

Most routines are CBM 128 and 1570/71 compatible in 64 mode.

QUIET DRIVE STOPS

This package incorporates new drive stops for **two 1541s** that will **end for good** the "wobbling" problem. The fitting process is very easy and a test program is provided to check the fit. Helps prevent future alignment problems and makes your drive purr with satisfaction.

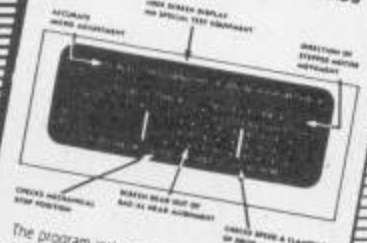
ONLY £4.95

STOP PRESS!!

Many software houses are now using "Anti-Freeze" in their software. This renders ordinary back-up cartridges useless. We are now shipping "Freeze Frame Mk. 3B" which will deal with these programs. As far as we know other competitive devices will NOT. Most new software will be using this so don't forget if you want results you must buy "Freeze Frame". Owners of Mk. 3 wanting Mk. 3B can upgrade for £5.00.

ALIGNMENT PROBLEMS?

1541 PHYSICAL EXAM
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The program includes a digital alignment disc and software which allows you to **accurately check and correct** disc drive alignment. The instruction booklet is **very detailed.** Also includes quiet drive stops to stop that "hammering" thus preventing further problems.

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Doubler has been an enormous success and continues to sell very well. Why? Because it is the **best product of its type** on the market. Doubler uses a unique method that copies **all types of software** regardless of speed. It consists of hardware and software. The software is the key part as unlike other products of its type Doubler creates a **brand new machine copy.** It is very easy to use and very successful. In fact our tests have proved that this "device" can achieve **100% success.** Requires access to two data recorders.
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Diskits 1, 2 and 3

*Here we start a series of very handy utilities written specially
for disk users.*

By Les Allan

DISKIT 1

Memory Saver is a useful routine aimed at saving all your machine's memory from \$0801 to \$FFFF. It is not intended to promote piracy, which may be the immediate conclusion which you leap to, because unlike commercial *Freeze Frames*, to name but one, the user can only work with material which is under his control. Without the knowledge of a start address it is of no use to you whatsoever.

The Facts

Two machine code routines are located at \$0247 and \$033C which provide the means to save memory between \$0801 and \$FFFF. The program saves three files as follows:

1. Main part - from \$0801 to \$CFFF
2. Kernal - from \$D000 - \$CFFF

In order to make use of the kernal routines for saving etc. this part is relocated to \$1000 and then saved between \$1000 - \$3FFF.

3. Boot part - from \$0801 - \$3FFF

This part contains the character and kernal RAM which is saved between \$1000 - \$3FFF. Two m/c routines are included to perform the following:

- (i) relocates the character/kernal ram to \$D00 - \$FFFF
- (ii) loads in the MAIN file and then runs it.

OK, so how do you go about using it!

Point number one is that you must know the start address of the program or you're lost before you start.

Instructions

1. Load in the program to convert into two parts
2. Press re-set switch if required (Quickdisk preferred).
3. Load "MEM1", 8, 1.
4. Load "MEM2", 8, 1.
5. Type in Basic SYS call
i.e. 10 SYS2061 (if that's the start address, of course). A JMP\$... command can be used to replace the RUN command in the BOOT file but you will need to use a m/c monitor or disk monitor to do this.
6. SYS 828 to save memory.
7. The two files BOOT and MAIN are now a complete working copy which can be individually crunched to save working space.
8. If, when the MAIN part is crunched, it crunches to less than 154 blocks then the KERN part \$1000 can be appended to this.

Remember that it is illegal to pirate software so this routine is for use with your own software!

The program as listed must be typed in exactly as written and saved prior to running. Error trap routines are included to ensure that the data as read is correct. The program when run stores the relevant code at a temporary address of \$8000 and when prompted relocates the working programs to Basic, warm start area and the cassette buffer and saves the programs to disk.

DISKIT 2

When programs are saved to disk very often there is a considerable duplication of adjacent data in memory which can be compressed by the use of a code compressor.

This Turbo Cruncher will work with either Basic or machine code programs providing that the program resides in memory from between \$0801 and \$D000.

The utility provides the user with the facility to view the directory with the F1 key or go straight to the cruncher with the F7 key. The program is then read in at turbo rate, common code compressed and re-saved back to disk at turbo rate prefixed with a '+'. The skill of the user will determine the results that are available but it is possible to fill memory with common code, \$EA for example, load in the machine code to memory and finally add a Basic boot to provide a single file that may exist between \$0801 and \$D000. The finished file can then be Turbo Crunched to produce a smaller working version which could be as small as 17 blocks which, considering the saved file was 202 blocks, represents a considerable saving on disk space.

Remember that it is illegal to pirate software so make sure that you only do this to your own programs!

The program must be typed in exactly as written and saved prior to running. Error trap routines are included to ensure that the data as read is correct. The program when run stores the relevant code at a temporary address of \$8000 and when prompted relocates the working program to Basic (\$0801) and saves the program to disk.

The program must be typed in exactly as written and saved prior to running. Error trap routines are included to ensure that the data as read is correct. The program when run stores the relevant code at a temporary address of \$8000 and when prompted relocates the working program to Basic (\$0801) and saves the program to disk.

DISKIT 3

This machine code program resides in the cassette buffer at \$033C and enables a program to be made into one part from the files called '+MAIN' and 'KERN'.

The program works by taking the results from the MEMORY SAVER routine which creates three files: 'MAIN', 'KERN' and 'BOOT'. If, when the MAIN file is Turbo Crunched the total length of the file is

71

FF	104	DATA	77,04,1F,1B,02,1B,13	08	146	DATA	67,67,77,7A,77,73,11	08	188	DATA	6D,6D,77,77,77,03,1E
			,77,15,12,77,07,1B,04,04,1E				,11,11,11,57,05,5D,7A,57,CE				,1A,12,77,04,1B,77,14,1B,1A
2D	105	DATA	15,15,12,77,03,1B,77	01	147	DATA	6D,CE,75,77,77,77,77	64	189	DATA	12,77,CE,77,15,12,77
			,14,1B,19,01,12,05,03,77,1E				,77,77,77,15,1B,1B,03,77,77				,16,77,04,07,07,03,77,77,77
AB	106	DATA	1B,1B,75,57,5E,5E,4C	71	148	DATA	77,77,77,77,73,67,6F	33	190	DATA	6D,6D,57,6E,4B,17,57
			,57,CE,75,77,77,03,1F,1B,04				,67,6E,77,7A,77,73,04,11,11				,6D,6D,77,77,77,77,77,77,77
F4	107	DATA	12,77,77,1A,02,1B,03	1F	149	DATA	11,57,FB,59,79,57,CE	60	191	DATA	77,77,77,77,77,77,77,77
			,1F,7A,07,1B,05,03,77,07				,6D,CE,75,77,77,61,7B,77,77				,77,77,77,77,77,77,77,77
96	108	DATA	05,1B,10,05,1B,1A,04	2B	150	DATA	77,14,05,02,19,14,1F	03	192	DATA	77,77,77,77,77,77,77,77
			,77,1E,1B,03,1B,77,1B,1B,1E				,77,14,1B,13,12,77,03,1B,77				,77,77,6D,6D,57,3E,4B,1B,57
A0	109	DATA	75,57,57,5B,4E,57,CE	07	151	DATA	04,1B,01,12,77,1A,12	06	193	DATA	6D,6D,77,77,77,77,77,77
			,75,77,77,1B,05,77,1E,03,77				,1A,1B,05,0E,57,09,59,7B,57				,10,1E,01,12,77,77,03,1F,12
99	110	DATA	1A,1B,04,03,77,23,00	87	152	DATA	CE,6D,CE,6D,CE,75,77	40	194	DATA	77,77,1F,CE,1B,02,05
			,1B,77,07,1B,05,03,04,7B,1E				,10,12,05,19,1B,1B,77,1E,04				,04,77,77,77,77,77,77,6D,6D
6D	111	DATA	03,77,1E,04,77,1E,12	6D	153	DATA	77,04,1B,01,12,13,77	8A	195	DATA	57,0D,4B,15,57,6D,6D
			,14,12,04,04,1E,05,03,75,57				,15,12,03,03,12,12,1B,77,77				,77,77,77,77,77,77,77,77,77
05	112	DATA	09,5B,4A,57,CE,75,77	1C	154	DATA	73,6B,67,67,67,77,71	68	196	DATA	77,77,77,77,77,77,77,77
			,77,1F,1B,00,1B,01,12,05,7B				,77,73,64,11,11,11,57,5B,5B				,77,77,77,77,77,77,77,77,77
D2	113	DATA	77,77,03,1B,77,1C,1B	CC	155	DATA	67,57,CE,6D,CE,75,15	59	197	DATA	77,77,77,77,77,77,77,77
			,1B,02,77,77,03,1F,12,77,04				,1B,1B,03,77,07,1B,05,03,77				,6D,6D,57,5E,4B,14,57,6D,6D
EF	114	DATA	03,1B,05,03,77,1B,13	4B	156	DATA	05,12,1B,1B,14,1B,03	21	198	DATA	77,77,77,03,1F,12,77
			,13,05,12,04,04,75,57,DE,5B				,12,04,77,1C,12,05,1B,1B,1E				,16,02,03,1F,07,77,77,77,77
F4	115	DATA	4B,57,CE,75,77,77,1B	03	157	DATA	77,1B,02,03,1B,1A,1B	7C	199	DATA	77,77,77,1B,12,04,77
			,11,77,03,1F,12,77,07,05,1B				,03,1E,14,1B,1B,1B,0E,57,7B				,1B,1B,1B,1B,1B,77,77,6D
4D	116	DATA	10,05,1B,1A,77,00,1F	3D	158	DATA	5B,6B,57,DC,95,7F,6B	20	200	DATA	6D,57,9C,4B,13,57,6D
			,1E,14,1F,77,14,1B,1B,77,15				,6E,6C,7E,5E,61,63,FC,63,6E				,6D,77,77,77,77,77,77,77,77
A1	117	DATA	12,77,1B,13,13,12,13	0B	159	DATA	57,7B,5B,6B,57,09,61	EE	201	DATA	77,77,77,77,77,77,77,77
			,77,03,1B,75,57,6D,5B,4B,57				,62,6B,6B,61,57,6B,5B,64,57				,77,77,77,77,77,77,77,77,77
D2	118	DATA	CE,75,77,77,03,1F,12	0B	160	DATA	6D,57,0C,5B,63,57,6D	E9	202	DATA	77,77,77,77,77,77,77,77
			,77,15,1B,1B,03,77,11,1E,1B				,6D,6D,6D,6D,6D,6D,6D,6D				,77,6D,6D,57,5E,4B,12,57,6D
71	119	DATA	12,77,1B,05,77,1B,04	96	161	DATA	6D,6D,6D,6D,6D,6D,6D,6D	40	203	DATA	6D,77,77,77,77,77,77,77
			,77,16,77,1B,1E,1B,12,77,1B				,6D,6D,6D,6D,6D,6D,6D,6D				,1B,03,1C,1E,1B,04,CE,77,13
FB	120	DATA	02,1A,15,12,05,77,03	C1	162	DATA	6D,6D,6D,6D,6D,6D,6D,6D	A7	204	DATA	05,1E,01,12,77,77,77
			,1B,75,57,8F,5B,77,57,CE,75				,6D,6D,6D,6D,6D,6D,6D,6D				,19,70,07,07,03,77,77,77,6D
6B	121	DATA	77,77,03,1F,12,77,1A	D4	163	DATA	6D,6D,6D,6D,6D,6D,6D,6D	A5	205	DATA	3A,20,2B,12,4B,03,3A
			,16,1E,19,77,11,1E,1B,12,77				,6D,6D,6D,6D,6D,6D,6D,6D				,3A,20,20,20,20,20,20,20
A1	122	DATA	77,77,77,77,77,77,12	1E	164	DATA	6D,6D,6D,6D,6D,6D,6D,6D	41	206	DATA	2C,20,20,20,20,20,20,20
			,79,1C,7B,77,6B,67,77,04,0E				,6D,6D,6D,6D,6D,6D,6D,6D				,2C,20,20,20,20,20,20,20
D2	123	DATA	04,77,65,57,61,6B,75	FF	165	DATA	6D,6D,6D,57,FA,5B,61	47	207	DATA	2D,2D,2D,2D,2D,2D,2D,2D
			,57,AD,5B,7B,57,DC,95,7F,6B				,57,6D,6D,77,77,77,77,77,77				,2C,3A,3A,02,54,12,47,00,3A
EE	124	DATA	6E,6D,7E,CE,61,63,FC	B9	166	DATA	77,77,77,77,77,77,77,77	47	208	DATA	3A,3A,3A,3A,3A,3A,3A,3A
			,E4,64,57,44,5A,75,57,DC,1B				,77,77,77,77,77,77,77,77				,3A,3A,3A,3A,3A,3A,3A,3A
0D	125	DATA	E5,57,FC,1B,05,6B,0D	E6	167	DATA	77,77,77,77,77,77,77,77	26	209	DATA	3A,3A,3A,3A,3A,3A,3A,3A
			,04,75,1A,12,1A,6B,75,7B,6F				,77,77,77,6D,6D,57,03,5B,6C				,3A,3A,3A,3A,3A,3A,3A,3A
74	126	DATA	7B,6B,57,7E,5A,74,57	BC	168	DATA	57,6D,6D,77,77,77,77,0B	DD	210	DATA	3A,3A,3A,00,7D,12,4B
			,DC,1B,05,6B,FC,1B,05,6B,6D				,12,1A,15,12,05,77,00,1F,12				,00,3A,3A,3A,3A,3A,3A,3A
1E	127	DATA	04,7B,1A,12,1A,6B,75	62	169	DATA	19,77,CE,1B,02,77,03	A4	211	DATA	3A,3A,3A,3A,3A,3A,3A,3A
			,7B,6F,7B,6B,57,6B,5A,73,77				,1B,1C,12,77,03,1F,12,77,77				,3A,3A,3A,3A,3A,3A,3A,3A
CC	128	DATA	DC,55,7B,6B,5E,6D,7E	BE	170	DATA	77,6D,6D,57,AA,5B,6F	A8	212	DATA	3A,3A,3A,3A,3A,3A,3A,3A
			,E5,61,63,FC,64,61,57,1D,5A				,57,6D,6D,77,77,77,77,77,77				,3A,3A,3A,3A,3A,3A,3A,3A
F1	129	DATA	72,57,CE,9D,7F,6B,63	CC	171	DATA	77,77,77,77,77,77,77,77	60	213	DATA	41,0D,01,00,00,00,00,00
			,6C,7E,57,21,5A,71,57,CE,75				,77,77,77,77,77,77,77,77				,EE,EE,EE,EE,EE,EE,EE,EE
C3	130	DATA	77,77,6B,79,77,77,77	57	172	DATA	77,77,77,77,77,77,77,77	B9	214	DATA	EE,EE,EE,EE,EE,EE,EE,EE
			,1B,1B,1B,13,77,1B,1B,77,07				,77,77,77,6D,6D,57,73,47,6E				,EE,EE,EE,EE,EE,EE,EE,EE
E1	131	DATA	05,1B,10,05,1B,1A,77	F9	173	DATA	57,6D,6D,77,77,77,77,14	B5	215	DATA	AS,1D,0D,10,0B,AS,0B
			,11,1B,05,77,14,1B,1B,01,1B				,05,12,13,1E,03,77,0E,77,03				,6D,11,0B,AS,0B,05,FC,AS,0B
5E	132	DATA	05,04,1E,1B,1B,57,FB	7B	174	DATA	1F,1E,04,77,77,07,05	0F	216	DATA	AS,FC,AD,12,01,FB,4B
			,5A,70,57,CE,CE,CE,75,77,77				,1B,10,05,1B,1A,1A,12,77,77				,57,91,FB,CE,DC,77,0E,FC,AS
AD	133	DATA	65,7B,77,77,77,07,05	F5	175	DATA	77,6D,6D,57,1A,47,6D	3F	217	DATA	FC,CE,12,DC,EF,6D,6E
			,12,04,04,77,05,1B,7A,04,12				,57,6D,6D,77,77,77,77,77,77				,EE,EE,EE,EE,EE,EE,EE,EE
CB	134	DATA	03,77,04,03,1B,03,14	D7	176	DATA	77,77,77,77,77,77,77,77	3D	218	DATA	EE,EE,EE,EE,EE,EE,EE,EE
			,1F,77,1B,11,77,05,12,0B,CE				,77,77,77,77,77,77,77,77				,EE,EE,EE,EE,EE,EE,EE,EE
CA	135	DATA	1B,03,12,13,57,94,5A	B7	177	DATA	77,77,77,77,77,77,77,77	7C	219	DATA	EE,EE,EE,EE,EE,EE,EE,EE
			,7F,57,CE,6D,CE,75,77,77,04				,77,77,77,6D,6D,57,21,47,6C				,EE,EE,EE,EE,EE,EE,EE,EE
CA	136	DATA	7B,77,77,77,1B,1B,1B	CF	178	DATA	57,6D,6D,77,77,77,77,03	B3	220	DATA	EE,EE,EE,EE,EE,EE,EE,EE
			,13,7C,1A,12,1A,6B,70,7E,6F				,1F,1B,03,77,1A,1B,1B,0E,77				,EE,EE,EE,EE,EE,EE,EE,EE
0B	137	DATA	7B,6B,57,6B,5A,7B,57	95	179	DATA	1F,1B,02,05,04,77,00	21	221	DATA	AD,0D,6D,0D,0B,AD,AD
			,6E,6D,CE,75,77,77,63,7B,77				,12,05,12,77,04,07,12,1B,03				,02,0B,0D,59,DC,FB,4C,67,02
14	138	DATA	77,77,1B,1B,1B,1B,13,7C	D1	180	DATA	77,77,77,6D,6D,57,CE	7F	222	DATA	7B,AD,34,05,01,AD,0B
			,1B,12,1A,6B,7C,7B,6F,7B,6B				,47,6B,57,6D,6D,77,77,77,77				,04,FB,84,FB,AD,1C,05,FC,AD
7B	139	DATA	57,5A,5B,7D,57,CE,6D	1A	181	DATA	77,77,77,77,77,77,77,77	F6	223	DATA	D0,05,FE,61,FE,91,FB
			,CE,75,77,77,62,7B,77,77,77				,77,77,77,77,77,77,77,77				,CE,DC,FB,0E,FC,0E,FE,DC,FB
AB	140	DATA	04,CE,04,6F,6B,6F,77	4B	182	DATA	77,77,77,77,77,77,77,77	B2	224	DATA	AD,37,05,01,5B,AD,0B
			,03,1B,77,04,1B,01,12,77,07				,77,77,77,77,77,77,77,77				,AA,AD,2D,BA,FB,AD,04,AD,FA
4A	141	DATA	05,1B,10,05,1B,1A,77	5D	183	DATA	47,6A,57,ED,ED,ED,77,77	43	225	DATA	AD,02,2D,ED,ED,ED,AD,0B
			,07,1B,05,03,04,57,6B,5B,7C				,77,15,0E,77,03,1F,12,77,1B				,2C,DC,FF,2D,ED,AD,2D,BE,AD
EB	142	DATA	57,CE,6D,CE,75,77,77	S6	184	DATA	02,03,1F,07,77,FB,77	71	226	DATA	4C,AD,AD,AD,AD,AD,AD,AD
			,77,77,77,77,1A,1B,1B,1B				,C3,77,77,0E,1B,02,77,77,77				,CC,DC,EE,EE,EE,EE,EE,EE
77	143	DATA	77,07,1B,05,03,77,73	B3	185	DATA	6D,6D,57,6E,47,6B,57	7E	227	DATA	AD,3B,05,01,AD,01,AD
			,67,6F,67,6B,7A,77,73,14				,6D,6D,77,77,77,77,77,77,77				,2B,AD,0B,05,2C,AD,ED,FE
FF	144	DATA	11,11,11,57,0C,5B,7B	1D	186	DATA	77,77,77,77,77,77,77,77	A5	228	DATA	03,AD,DC,ED,FF,03,2D
			,57,CE,6D,CE,75,77,77,77				,77,77,77,77,77,77,77,77				,CE,03,7B,AD,34,05,01,AD,0B
21	145	DATA	77,77,77,1C,12,05,1B	FA	187	DATA	77,77,77,77,77,77,77,77	2F	229	DATA	84,2B,84,FB,84,FB,AD
			,1B,1B,77,77,77,73,13,67				,77,77,6D,6D,57,44,4B,6B,57				,1C,05,2C,05,FC,AD,DC,05,FC


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46 230 DATA B1,FD,91,FE,C9,D0,FB
    ,EE,FC,EE,FE,DC,F2,AE,37,B5
70 231 DATA 01,5B,AB,ED,DC,FE,03
    ,AB,4C,0D,FF,03,2C,CE,C3,AB
14 232 DATA 00,AB,B4,FB,A2,08,B6
    ,FC,91,FE,CB,D0,FE,EE,FC,AG
7E 233 DATA FC,ED,10,00,FB,A2,00
    ,ED,FS,03,9D,01,00,EB,E0,29
53 234 DATA D0,FS,A2,00,ED,A7,02
    ,9D,00,0B,EB,E0,59,02,FS,AB
F3 235 DATA 01,85,20,AB,00,AB,2C
    ,AB,FB,ED,FE,C3,20,CE,03,4C
72 236 DATA 66,FE,AB,00,AB,AB,20
    ,BA,FF,AB,04,AB,FE,03,AC,03
B3 237 DATA 20,ED,FF,AB,2B,A2,00
    ,AC,FF,03,4C,0B,FF,4D,41,49
24 238 DATA 4E,4D,45,52,4E,42,4F
    ,4F,54,0B,08,0C,00,9E,32,30
59 239 DATA 36,31,20,00,EE,EE,EE

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    ,EE,EE,EE,EE,EE,EE,EE,EE
8C 240 DATA AD,C0,AB,B5,FB,B5,FD
    ,AB,ED,05,FC,AB,0B,05,FE,B1
6F 241 DATA FB,B1,FD,CB,D0,FB,EB
    ,FC,EE,FE,AS,FC,C9,AC,00,EF
0B 242 DATA A2,03,ED,C0,AB,9D,A7
    ,C2,EB,ED,5B,DC,FE,A2,00,ED
76 243 DATA 60,00,0D,3C,03,EB,ED
    ,C4,00,FS,AB,0B,AB,AB,20,BA
77 244 DATA FF,AB,0C,AB,C0,AB,BC
    ,20,0D,FF,AB,01,05,2B,AB,CB
CA 245 DATA B5,2C,AB,2B,AB,00,AB
    ,12,20,0B,FF,AB,04,AB,ED,AC
FA 246 DATA BC,20,ED,FF,AB,A7,B5
    ,2B,AB,02,B5,2C,AB,2B,AB,00
1C 247 DATA A3,03,20,0B,FF,AB,04
    ,A2,EB,AB,0C,20,ED,FF,AB,3C
3B 248 DATA B5,2B,AB,03,B5,2C,AB
    ,2B,AB,00,AB,04,20,0B,FF,4C

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1F 249 DATA 66,FE,EE,EE,EE,EE,EE
    ,EE,EE,EE,EE,EE,EE,EE,EE
01 250 DATA 4D,45,4D,4F,52,59,20
    ,53,41,56,45,52,EE,EE,EE,EE
29 251 DATA 4D,45,4D,31,EE,EE,EE
    ,EE,4D,45,4D,32,EE,EE,EE,EE
23 252 DATA EE,EE,EE,EE,EE,EE,EE
    ,EE,EE,EE,EE,EE,EE,EE,EE
C7 253 :
C1 254 :
FF 255 :
A4 256 : MEMORY SAVER BY LE
S ALLAN
2D 257 : 2B ATKINSON DRIVE NEW
PORT IW
B3 258 :

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PROGRAM: TURBO CRUNCHER CREATOR

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44 10 H1=32768:H2=38950:CH=0
57 11 PRINTCHR$(H1)CHR$(H2)
C9 12 POKE52,120:POKE56,120:POKE
    53280,15:POKE53281,12
94 13 PRINT
0F 14 PRINTSPC(8)CHR$(18)"[SU,S*
    22,SIC
25 15 PRINTSPC(8)CHR$(18)"[S-,SP
    C22,S-3
54 16 PRINTSPC(8)CHR$(18)"[S-,SP
    CH1DATA STATEMENTSPC3,S-3
3C 17 PRINTSPC(8)CHR$(18)"[S-,SP
    C22,S-3
E5 18 PRINTSPC(8)CHR$(18)"[S-3
    TO MEMORY ROUTINE [S-3
4A 19 PRINTSPC(8)CHR$(18)"[S-,SP
    C22,S-3
22 20 PRINTSPC(8)CHR$(18)"[S-,SP
    C51EY LES ALLAN[SPC5,S-3
50 21 PRINTSPC(8)CHR$(18)"[S-,SP
    C22,S-3
6C 22 PRINTSPC(8)CHR$(18)"[S3,S*
    22,SK3
A0 23 PRINT:PRINTCHR$(155)
4E 24 PRINT" THIS ROUTINE READS
    THE DATA STATEMENT,"
60 25 PRINT
17 26 PRINT" CONVERTS FROM HEX
    TO BINARY AND POKES"
82 27 PRINT
04 28 PRINT" CODE BACK TO THE
    AREA OF MEMORY FROM"
84 29 PRINT
19 30 PRINT" WHICH IT WAS PRE
    VIOUSLY GENERATED,"
59 31 PRINT:PRINT
00 32 READCODES
E9 33 L0=ASC(RIGHT$(CODES,100)-40
    -1)FILE$BINEHL0-7
0F 34 H0=ASC(LEFT$(CODES,100)-40:
    IFH0$BINEH0-7
32 35 PRINTSPC(5)CHR$(5)"READI"3
    MEMORY BLOCK ...":H1:PRINTCH
    R$(145);
2B 36 POKEH1,H0*16+L0:H1=H1+1:CH
    =CH+H0+L0:IFH1<32768GOTO32
82 37 IFCH=38951THEN32
13 38 PRINT"CHECK SUM ERROR - CH
    ECK DATA STATEMENTS":PRINTCH
    R$(19):END
EC 39 PRINT" HIT RETURN TO SAVE
    COMPLETED PROGRAM"
01 40 GETKEYS:IFKEYS<>CHR$(13)TH
    EN40
70 41 SYS38864
10 42 :
CE 43 :
16 44 :

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AD 45 DATA 00,08,09,00,00,9E,32,
    30,36,31,02,00,00,20,44,EE
2D 46 DATA A9,0C,00,ED,20,00,00,21,
    00,EA,AB,36,B5,01,4C,E7,1E
64 47 DATA A9,00,20,02,FF,EB,ED,
    05,00,FB,AB,1B,AB,1B,20,1E
1E 48 DATA AB,20,04,FF,CB,B5,FC,
    0F,C9,8B,FO,0B,AB,20,02,49
80 49 DATA 03,8D,20,00,4C,31,0B,
    02,0F,0E,00,00,CB,B5,FC,1F
79 50 DATA 4C,30,1B,EA,04,5B,20,
    F2,0B,4C,72,0B,20,47,CB,4C
03 51 DATA 00,0B,20,AB,0B,4C,72,
    0B,20,00,05,4C,00,0B,20,0B
8D 52 DATA 09,20,04,FF,FO,FB,4C,
    02,0B,00,42,2C,AB,AF,CB,20
14 53 DATA 02,FF,CB,23,02,FB,60,
    20,0C,EE,AB,04,20,02,FF,EB
CE 54 DATA E3,15,00,FB,50,20,0C,
    EE,AB,AB,20,02,FF,EB,ED,15
01 55 DATA D0,FB,50,AB,03,02,17,
    20,0C,EE,20,CF,FF,4B,C9,4E
B1 56 DATA D0,2A,AB,50,AB,13,B5,
    FC,B4,FD,AB,29,AB,0B,B5,FE
10 57 DATA B4,FF,AB,ED,AB,05,B5,
    90,B4,23,20,00,00,20,CE,0E
02 58 DATA AB,20,20,AB,FF,AB,0B,
    20,AB,FF,02,02,20,0B,00,EB
CA 59 DATA D0,03,20,CF,FF,CB,0D,
    FO,CB,2C,AB,FF,9C,F4,4C,AE
01 60 DATA FF,AB,03,02,17,20,0C,
    EE,20,AE,0D,20,AB,FF,CB,0D
FD 61 DATA FC,05,20,02,FF,00,F4,
    4C,AB,FF,20,2A,0B,20,50,2B
E5 62 DATA D0,07,20,72,0B,00,02,
    00,F4,20,AB,FF,AB,CB,20,01
3D 63 DATA FF,AB,ED,20,23,FF,4C,
    AB,FF,20,44,EE,AB,0B,20,01
86 64 DATA FF,AB,FO,20,03,FF,AB,
    24,20,AB,FF,20,AB,FF,AB,0B
73 65 DATA 20,B4,FF,AB,60,20,5B,
    FF,AB,00,AB,90,AB,03,60,B4
6E 66 DATA B7,20,AB,FF,AB,03,20,
    AB,FF,AB,C4,AB,90,00,11,04
6D 67 DATA B7,8B,00,EB,AB,73,AB,
    C4,20,00,ED,20,7F,CB,AB,00
BA 68 DATA 60,20,AB,FF,FO,25,20,
    02,FF,00,FB,4C,84,CB,AB,20
23 69 DATA 4C,02,FF,AB,00,4C,02,
    FF,AB,60,CB,20,00,07,AB,0E
92 70 DATA AB,17,4C,1E,AB,AB,C4,
    FO,C7,AB,FD,AB,16,4C,1E,AB
AB 71 DATA AB,C3,CB,EB,00,FB,AB,
    60,20,FB,CB,AB,02,EB,ED,40
3B 72 DATA 03,CB,22,CB,AB,61,
    EB,ED,40,C3,CB,22,CB,0E,01
11 73 DATA 62,EB,CB,00,FB,BA,AB,
    60,1B,EE,B1,99,14,1B,AB,C3
5D 74 DATA 99,34,1B,9D,42,CB,00,

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    07,AB,1B,AB,17,4C,1E,AB,CB
93 75 DATA 53,FB,07,CB,50,FB,03,
    EB,02,EB,99,54,1B,EB,60,60
1B 76 DATA AC,C0,0A,CA,B4,B3,CA,
    26,63,CA,26,63,05,62,AB,62
4F 77 DATA 1B,69,EB,05,62,AB,63,
    69,1B,AB,63,60,AB,5F,ED,14
F2 78 DATA 1B,AB,61,BA,20,FB,CB,
    61,62,20,02,FF,99,40,03,CB
03 79 DATA C4,61,00,FB,AB,03,ED,
    47,17,99,40,03,CB,CA,10,FB
23 80 DATA AB,5F,20,54,1B,99,3D,
    03,60,AB,59,9B,AB,4C,AB,03
82 81 DATA 20,ED,FF,4C,CB,FB,AB,
    00,AB,63,20,2A,05,20,50,0B
1E 82 DATA 22,72,0B,20,84,CB,AB,
    02,20,50,29,AB,02,20,AB,FF
67 83 DATA FC,09,20,02,FF,99,40,
    03,CB,00,FB,20,AB,FF,20,AB
5D 84 DATA FF,AB,50,00,7B,AB,00,
    AB,0B,AB,1E,AB,03,AB,CA,AB
04 85 DATA 16,20,1B,AB,20,E1,FF,
    00,03,4C,1A,CB,20,24,FF,CB
12 86 DATA 4E,FO,13,CB,63,CB,ED,
    AB,05,AB,16,20,1E,AB,20,8B
5D 87 DATA 39,AB,01,4C,5B,CA,AB,
    EB,AB,16,20,1E,AB,4C,AB,CA
0E 88 DATA 20,1A,CB,AB,60,00,01,
    60,AB,00,06,5F,AB,4B,AB,17
62 89 DATA 20,1E,AB,20,AB,CB,ED,
    03,AB,00,2C,AB,03,AB,6D,AB
0B 90 DATA 00,AB,5E,AB,5F,AB,FF,
    9D,74,1B,AB,22,9D,95,1B,AB
7A 91 DATA 2F,AB,17,20,1E,AB,AB,
    5F,ED,74,1B,AB,AB,ED,95,1B
75 92 DATA AB,AF,20,00,CA,AB,00,
    20,3A,CA,20,DE,0B,90,17,20
4B 93 DATA B4,09,20,FB,0B,AB,5F,
    AB,00,9D,14,1B,ED,74,1B,AB
53 94 DATA AE,8D,95,1B,AB,AB,AB,
    5F,EB,3B,AB,AE,9D,74,1B,AB
03 95 DATA AF,9D,95,1B,7D,34,1B,
    B3,CA,EB,60,00,CB,EB,5F,EB
AC 96 DATA 5E,00,AB,3B,AB,5E,95,
    5C,AB,5F,EB,5E,AB,5F,20,CA
88 97 DATA 0B,AB,5F,ED,14,1B,FO,
    35,AB,3B,AB,17,20,1E,AB,20
9D 98 DATA 00,CA,AB,57,99,3F,CB,
    AB,5F,ED,74,1B,AB,AB,ED,95
82 99 DATA 1B,AB,AB,ED,75,1B,AB,
    AB,ED,96,1B,AB,AB,AB,01,20
EB 100 DATA 3A,CA,20,07,00,90,0B,
    20,04,0B,20,FB,CB,CB,5E,30
AB 101 DATA CB,EE,5F,AB,50,FO,BA,
    20,AB,20,AB,02,20,06,AB,5C
0A 102 DATA AB,5E,10,9F,EB,5F,AB,
    5F,C5,60,00,06,20,C1,0B,4C
BF 103 DATA D0,CA,60,AB,80,AB,17,
    20,1E,AB,20,E1,FF,00,C4,6B

```


22	104	DATA	68,18,60,20,E4,FF,C9	03	146	DATA	F0,AS,37,B5,01,E6,43	E1	188	DATA	0E,20,50,01,E6,0C,AS
			,B5,F0,F7,C9,B6,D3,EC,38,50				,C8,45,02,DA,20,CE,0E,20,CA				,C7,DC,0E,AS,B1,05,09,AS,8C
3C	105	DATA	AS,B5,A0,17,20,1E,AB	0C	147	DATA	2E,20,46,2D,AS,7E,20	7C	189	DATA	C5,C8,03,04,E6,06,0C
			,F0,C7,AS,D3,AD,17,20,1E,AB				,AB,FF,AS,04,20,B9,01,AD,03				,0E,AS,00,85,09,20,CA,FS,50
4D	106	DATA	20,E1,FF,F0,DA,20,E4	FD	148	DATA	84,01,81,12,99,14,18	52	190	DATA	FE,EB,AD,01,1C,91,3D
			,FF,C8,0D,00,F4,60,AS,41,A0				,C8,00,FS,B4,CA,AC,5A,50,FE				,CB,DC,FS,B4,CA,AC,5A,50,FE
70	107	DATA	0F,B5,FC,84,F0,AS,00	95	149	DATA	8D,14,18,20,CF,3D,EB	1A	191	DATA	88,AD,01,1C,99,02,01
			,AD,04,85,FE,84,FF,AS,51,A0				,C3,F7,66,43,20,CE,01,CE,45				,CB,DC,F4,20,EO,FB,AS,06,8D
65	108	DATA	05,B5,80,84,93,20,00	35	150	DATA	00,00,80,CE,05,20,A4	C7	192	DATA	15,02,C6,29,F0,05,C8
			,00,AS,C5,20,AB,FF,AS,04,20				,CD,00,C4,E6,44,45,44,C8,C3				,1C,FE,30,1A,AS,0E,AS,09,C4
1E	109	DATA	AB,FF,20,AS,FF,78,20	03	151	DATA	F3,03,40,2E,0E,20,45	09	193	DATA	08,D0,02,85,0A,AC,02
			,70,00,10,C3,40,76,00,28,20				,CD,40,34,0F,AS,44,AS,EA,C8				,8D,00,C2,E1,30,C8,C4,0A,DC
A7	110	DATA	70,00,29,00,00,00,AA	23	152	DATA	02,00,01,CA,86,45,BA	58	194	DATA	F9,C8,00,00,1C,18,AS
			,85,AA,00,00,40,48,28,70				,E2,20,AB,FF,20,AS,78,89				,C8,66,C7,C5,43,85,09,AC
13	111	DATA	05,00,AB,FE,85,AA,AD	1E	153	DATA	19,85,43,AS,14,95,42	0C	195	DATA	ES,43,85,09,00,AS,AS
			,00,AD,C2,00,C8,08,80,C2,DD				,20,AC,0E,40,0F,00,29,02,8D				,00,85,08,AS,81,85,08,40,18
8E	112	DATA	AD,00,DD,10,FB,AD,00	2A	154	DATA	00,00,AD,11,03,09,10	06	196	DATA	F4,1C,C5,FE,20,00,18
			,DD,29,03,80,00,DD,AD,0A,CA				,8D,11,00,88,18,80,22,70,0D				,1C,FE,AS,1C,8D,C0,18,20,C0
0F	113	DATA	00,FD,AD,04,AD,00,DD	51	155	DATA	10,FD,29,7F,20,04,0F	C6	197	DATA	18,30,FE,AD,04,CA,00
			,CA,2A,66,90,4A,66,90,EA,CA				,0E,C8,18,80,07,10,20,70,00				,FD,8E,C0,18,AD,C1,AD,00,18
1E	114	DATA	00,F2,AS,90,AD,34,86	AD	156	DATA	20,01,0F,8E,11,18,8C	D3	198	DATA	4A,C8,4A,4A,68,CF,20
			,01,91,AE,AD,37,86,01,CB,DD				,12,18,AD,FE,00,17,20,15,AD				,66,CF,CA,DD,F1,AD,CF,8D,00
47	115	DATA	E1,08,18,AS,AA,65,AE	28	157	DATA	79,38,60,48,4A,04,2B	49	199	DATA	18,AS,2F,60,85,CF,2E
			,85,AE,90,02,EE,AF,28,70,C3				,FB,AA,FC,C8,18,AD,C2,6A,1E				,C0,18,1C,FE,AS,1C,8D,C0,18
53	116	DATA	40,C7,0C,AS,00,AB,20	11	158	DATA	CA,00,FS,05,40,08,68	14	200	DATA	2C,00,18,30,FE,AD,04
			,CE,0E,AS,40,85,90,88,10,C3				,29,CF,C8,CA,80,C2,69,C5,FB				,AS,00,46,CF,2A,CA,46,CF,2A
64	117	DATA	40,33,FE,4C,28,FS,AS	34	159	DATA	65,40,00,48,4A,04,2B	58	201	DATA	0A,DD,00,18,CA,00,FB
			,92,AD,10,85,FC,84,FD,AS,00				,C8,30,AA,80,80,CF,00,30,AB				,AD,01,CA,DD,FD,EA,EA,AD,CF
FS	118	DATA	AD,04,85,FE,84,FF,AS	8C	160	DATA	60,AD,22,20,AB,FF,AS	EB	202	DATA	BD,30,18,60,AS,EO,85
			,CA,AD,06,85,80,84,83,20,00				,ED,20,AB,FF,40,AS,FF,AS,03				,01,58,AS,01,30,FC,78,C9,02
9C	119	DATA	0D,AD,00,DD,29,23,85	A2	161	DATA	85,31,20,CA,FS,50,FE	76	203	DATA	60,AS,03,85,00,20,00
			,83,AS,FE,20,AB,FF,AS,05,20				,00,AD,21,10,30,00,00,FS				,05,00,30,AS,80,C8,12,FC,1E
AY	120	DATA	AB,FF,20,AS,FF,78,AS	02	162	DATA	AC,8A,60,FC,68,AD,C1	8E	204	DATA	90,15,EE,80,AS,80,C9
			,CC,85,FE,20,6E,00,20,70,CD				,1C,89,00,01,C8,00,F4,20,EC				,24,00,EE,AD,11,8E,80,AS,00
0F	121	DATA	30,24,AD,C3,AS,34,95	ED	163	DATA	FB,AS,38,C6,47,FC,03	D3	205	DATA	85,81,C8,00,00,CF,18
			,01,81,AC,48,45,FE,85,FE,AS				,40,FB,F4,20,ES,FS,C5,3A,FC				,60,C6,80,DD,09,AD,13,86,80
84	122	DATA	37,85,01,89,20,CF,0D	81	164	DATA	03,40,C3,FS,AD,C0,23	06	206	DATA	AS,20,85,81,C8,8D,DD
			,20,DE,FC,CA,00,EE,AS,FE,20				,20,8A,C4,AD,01,C3,20,8A,C4				,C0,FC,EC,AS,81,18,65,69,85
1A	123	DATA	CF,0D,70,C6,50,00,30	39	165	DATA	AC,22,20,20,18,10,FD	5E	207	DATA	81,AS,80,20,48,FE,8D
			,C8,10,08,20,CF,C0,22,70,2D				,AD,10,8D,C0,18,20,20,18,30				,4E,C2,C5,81,80,C0,38,AS,81
45	124	DATA	08,20,CE,CE,AS,03,85	3E	166	DATA	F0,85,00,C3,48,FE,85	4E	208	DATA	ED,4E,02,85,81,FD,02
			,92,20,10,C2,38,00,18,EC,20				,CF,AD,C4,AS,C2,4E,2A,CA				,C6,81,20,D7,05,00,09,AS,00
AB	125	DATA	C2,0D,AS,57,20,AB,FF	09	167	DATA	46,CF,8A,C4,8D,C0,18	56	209	DATA	85,81,20,D7,05,FD,8F
			,AS,FE,20,AB,FF,AD,FF,20,AB				,CA,02,FC,C8,FA,FA,C0,EE,AD				,E1,8D,8D,85,EF,81,8D,AD,00
70	126	DATA	FF,AS,1E,20,AS,FF,AC	88	168	DATA	CF,8D,C0,18,AD,C1,C3	1F	210	DATA	B1,50,38,85,01,91,50
			,CC,01,FC,20,AD,FF,C8,C0,1E				,85,09,AD,C0,C3,C8,C0,C3				,38,63,AS,80,0A,CA,85,80,AC
FE	127	DATA	90,FS,20,AS,FF,18,AS	02	169	DATA	AC,04,C1,85,C9,40,18	C3	211	DATA	00,81,50,60,AD,C0,84
			,FC,88,1E,85,FC,00,C3,EE,FD				,F4,85,0F,AD,C0,18,10,FE,AD				,6F,AS,80,20,4E,FE,8D,4E,C2
09	128	DATA	18,AS,FF,AS,FF,59,1E	00	170	DATA	10,80,C0,18,20,C0,18	ES	212	DATA	AS,81,C0,4E,C2,80,39
			,85,FE,03,C2,EB,FF,F4,93,80				,30,FB,AD,C4,AS,C0,4E,CF,2A				,20,D5,EF,D0,C5,EE,81,D0,FC
02	129	DATA	EE,C5,90,90,8A,AD,11	0A	171	DATA	CA,46,CF,2A,CA,8D,C0	2A	213	DATA	AS,30,60,20,42,D0,20
			,DC,29,EE,80,11,00,20,C2,C0				,18,CA,DC,FC,AD,C1,CA,DD,FD				,AB,06,78,FC,CF,AD,C0,1C,29
00	130	DATA	AS,45,40,AS,FF,38,AS	D3	172	DATA	EA,EA,AS,CF,8D,C0,18	C2	214	DATA	10,DD,04,AS,C8,00,50
			,AS,ES,AC,AA,AD,AS,AF,ES,AD				,60,85,C1,86,AS,C1,30,FC,78				,AS,63,00,40,AD,C1,21,86,FC
18	131	DATA	C0,C8,EC,FF,80,C4,C8	C3	173	DATA	C9,C2,50,78,AS,18,C9	CE	215	DATA	FE,85,28,85,80,C0,81
			,98,00,C7,AE,FE,AS,C2,80,FC				,12,DC,05,AS,62,40,3E,C5,85				,86,85,09,85,81,AD,63,8D,75
03	132	DATA	07,C8,88,C8,40,48,28	92	174	DATA	08,AS,19,85,09,AS,C0	CA	216	DATA	FS,90,50,31,CA,10,FF
			,88,40,CF,00,AD,C3,C0,29,03				,85,C6,85,07,85,10,85,0D,AD				,AS,60,8D,84,01,ES,85,0E,86
06	133	DATA	C8,C8,80,C0,00,AD,C0	38	175	DATA	C4,AS,00,20,8A,C4,90	8D	217	DATA	C7,86,00,20,C0,C5,20
			,DD,10,FE,AD,20,C0,25,C3,80				,05,CA,DD,FE,50,C7,AS,EO,20				,D7,05,20,EA,05,AD,C4,AS,00
42	134	DATA	00,DD,AD,CE,88,EA,00	05	176	DATA	BA,C4,90,20,AS,10,FO	0F	218	DATA	20,43,25,90,C5,CA,DD
			,FE,AD,C4,AD,00,DD,C4,EA,EE				,0D,C6,10,AS,C0,20,8A,C4,AS				,FE,50,C8,20,47,C5,50,C6,AS
01	135	DATA	80,4A,66,50,EA,88,00	7E	177	DATA	00,85,C5,85,07,AS,06	7A	219	DATA	C7,FC,88,C0,1A,C9,7E
			,FE,AS,90,46,FF,80,AD,C8,20				,89,DD,FE,FC,21,AS,C7,3E,FB				,48,FC,C3,20,ET,C4,09,80,20
03	136	DATA	84,FF,AS,CF,40,85,FF	AE	178	DATA	08,FE,85,07,80,06,FE	4F	220	DATA	17,05,68,C8,03,00,09
			,AD,C8,20,81,FF,AD,CF,40,03				,58,20,76,06,78,EE,C6,00,EF				,AD,C1,20,CA,EE,20,C8,C1,20
03	137	DATA	FF,20,00,00,AD,40,00	D3	179	DATA	AS,C7,88,20,76,06,78	49	221	DATA	ET,C4,AS,00,20,17,05
			,AB,FF,AS,20,40,AB,FF,85,90				,AS,C8,DD,AA,FC,1F,AS,0D,DD				,58,20,AD,C6,81,86,09,80,91
FC	138	DATA	AD,20,00,00,00,00,00	71	180	DATA	C6,ES,13,EE,C0,00,AB	20	222	DATA	86,AD,1C,AS,C0,91,86
			,00,C0,DD,AD,C0,00,10,FE,AD				,48,C0,00,20,8A,C4,8D,8D				,AS,90,20,AC,C6,AS,12,85,0E
70	139	DATA	30,DD,29,C3,80,20,00	FD	181	DATA	00,C3,20,C8,C1,AD,01	DE	223	DATA	AS,90,AD,24,20,AD,28
			,AD,C4,AS,93,46,00,EA,46,90				,AS,C1,20,CA,EE,40,94,C1,AS				,20,42,00,40,94,C1,AD,C0,20
0A	140	DATA	6A,4A,4A,80,C0,DD,88	41	182	DATA	44,4A,C5,85,AA,80,C6	05	224	DATA	7D,05,40,89,05,AD,61
			,DD,FD,AD,C1,88,DD,FD,60,20				,C6,85,89,AC,C4,CA,02,C1,C8				,C2,85,07,AS,12,85,C6,AS,80
98	141	DATA	44,ES,AS,1F,AD,14,85	06	183	DATA	84,C7,AS,C0,85,05,20	08	225	DATA	20,AD,C6,AS,03,85,87
			,FC,84,FD,AS,00,AD,C4,85,FE				,ET,C4,FC,C8,85,81,85,C7,AA				,AD,67,02,85,86,AD,C0,81,86
0E	142	DATA	85,44,84,FF,AS,AC,AD	D1	184	DATA	88,85,C8,AS,00,85,80	53	226	DATA	89,80,60,09,0A,0A,08
			,C5,85,90,84,93,20,C0,0D,20				,F3,C0,20,54,C5,80,C5,AS,72				,20,EE,C1,C2,C5,AS,34,40,C6
8A	143	DATA	34,0F,20,CE,0E,20,C1	6A	185	DATA	4C,69,AS,00,20,17	28	227	DATA	C1,8C,7A,C0,AS,AD,20
			,C8,20,46,C0,AS,45,20,AD,FF				,C5,AS,80,8D,C0,C3,AS,81,2D				,68,C2,20,C0,C1,AD,79,C2,C0
78	144	DATA	AS,04,20,89,0E,20,0E	0C	186	DATA	01,C3,AS,C3,85,31,AD	A6	228	DATA	74,C2,00,C3,40,46,EE
			,0E,DD,18,AD,C0,20,7C,DD,9D				,C2,23,ET,C4,91,30,C8,C4,0E				,89,C0,C2,85,12,89,C1,C2,85
7E	145	DATA	14,18,88,03,FF,AD,00	B1	187	DATA	DD,FS,20,ET,C4,AS,C6	46	229	DATA	13,AD,C0,8D,C7,FA,DD
			,34,C1,89,14,18,51,42,C8,DD				,8D,C0,C2,AS,C9,8D,15,C2,85				,C0,C4,EB,EC,49,20,FS,AD,C0


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47 314 DATA 4F, 47, 20, 44, 4F, 45, 53
    , 20, 45, 4F, 54, 20, 53, 54, 41, 52
07 315 DATA 54, 20, 41, 54, 20, 24, 30
    , 30, 30, 31, 20, 21, 00, 00, 00, 45
50 316 DATA 52, 52, 4F, 52, 00, 20, 00
    , 53, 45, 41, 52, 43, 40, 40, 45, 47
E5 317 DATA 20, 45, 4F, 52, 20, 41, 20
    , 43, 4F, 44, 45, 00, 00, 00, 43, 52
AD 318 DATA 55, 45, 43, 40, 49, 45, 47
    , 00, 00, 20, 24, FF, 05, 08, FC, 01
93 319 DATA 50, 20, 20, 10, 50, 50, 40
    , 00, 00, A9, CB, AC, 1A, 20, 15, A0
21 320 DATA 20, CF, FF, A2, 01, C5, 20
    , FC, F3, 9D, 3F, 03, E9, EC, 11, F0
EE 321 DATA 07, 20, CF, FF, C9, 0D, 00
    , ED, A9, 20, 9D, 3F, 03, E8, A9, 50
CF 322 DATA 9D, 3F, 03, E8, A9, 20, 9D
    , 3F, 03, E8, B5, B7, A9, 52, 9D, 3F
A0 323 DATA 03, 20, 01, 0A, A9, 00, A4
    , E7, 20, 3A, CA, A9, FF, 05, AE, A9
1A 324 DATA 22, 05, AF, 20, 0E, 00, 90
    , 15, A0, FC, AC, 1A, 00, 04, A9, 0E
B3 325 DATA A0, 1A, 20, 1E, A9, 20, E4
    , FF, F0, FB, E0, 00, 02, AD, FF, 22
5E 326 DATA C9, 01, 20, EA, AD, 00, 23
    , C9, C9, DC, E3, 20, CB, 1D, A5, 04
BF 327 DATA A0, 10, 20, 40, 1D, 79, A9
    , 34, B5, 01, A9, 23, B5, FF, A9, 01
1E 328 DATA 05, FE, A9, 8D, 00, 1F, EB
    , 0C, FA, A9, B1, FE, A9, ED, 00, 1F
96 329 DATA C9, FF, F0, 03, FE, 00, 1F
    , 20, FB, 10, 00, EE, A9, FE, AA, B5
1A 330 DATA FD, 0D, 00, 1F, 90, C9, F0
    , 07, B5, FD, 8D, 00, 1F, F0, 05, CA
3C 331 DATA E0, FF, 00, E0, B5, FC, 18
    , 9C, 13, B5, 07, E6, FE, DC, 02, E6
E0 332 DATA FF, A5, FE, C5, AE, A5, FF
    , E5, AF, A5, 07, E0, 20, AB, 1E, EA
41 333 DATA A9, 15, A9, 20, 1E, A3, 7B
    , A9, 34, B5, 01, A9, 20, B5, FE, B5
4A 334 DATA 2F, A9, 23, B5, FF, B5, 30
    , A9, FD, 8D, C2, 1C, A9, 21, 8D, C3
60 335 DATA 1C, EA, A5, FD, 8D, A9, 21
    , 8D, F3, 21, A0, 00, B1, FE, 05, 02
09 336 DATA C5, FD, 00, 11, A9, 8D, 20
    , C1, 1C, A5, FE, 20, C1, 1C, A5, FF
55 337 DATA 20, 48, 1E, 00, 55, A2, 01
    , 20, FB, 18, E0, 3C, 01, FF, DC, 30
AE 338 DATA E9, 20, FB, 18, 50, 32, 01
    , FE, 00, 2E, E8, 20, FB, 18, E0, 30
93 339 DATA E0, FF, F0, 04, 01, FE, F2
    , F2, A0, 00, 91, 2F, CB, BA, 91, 2F
06 340 DATA CB, A5, FD, 91, 2F, A5, 2F
    , 18, 59, 03, B5, 2F, 90, 02, E6, 30
27 341 DATA EA, 20, 1C, 90, A4, 50
    , 23, B6, 03, A5, FE, 38, E5, 03, B5
68 342 DATA FE, 8D, 02, C6, FF, A5, 02
    , 18, 90, 04, A5, 02, 49, FF, 91, 2F
3C 343 DATA E6, 2F, 00, 02, E6, 30, 20
    , FB, 18, 90, B1, A9, 37, B5, 01, 58
E7 344 DATA 00, 0C, 8D, 06, 22, 5E, C2
    , 1C, 00, 03, EE, C3, 1C, 60, 4C, 58
66 345 DATA 10, 0D, 0D, 50, 52, 4F, 47
    , 52, 41, 4D, 20, 4C, 45, 4E, 47, 54
BF 346 DATA 48, 20, 3D, 20, 00, 20, 42
    , 4C, 4F, 43, 48, 53, 0D, 00, 04, B8
55 347 DATA A2, 00, E8, A5, AE, 39, E9
    , FE, B5, AE, A5, AF, E9, 00, B5, AF
08 348 DATA A5, AF, C9, 23, 00, EC, 50
    , 00, 20, 2B, 1D, B6, 04, 90, 05, 20
EC 349 DATA 2B, 1D, 9C, 05, 96, 03, A9
    , D0, A0, 1C, 20, 1E, AB, A5, 06, A9
20 350 DATA 00, 20, CD, ED, A9, 54, A0
    , 1C, 4C, 1E, AB, A5, AE, 48, A5, AF
13 351 DATA 48, 20, F0, 1C, 58, B5, AF
    , 58, B5, AE, 18, 6C, 00, 04, B9, 20
A7 352 DATA 1E, A5, A2, 1F, 5D, 00, 23
    , 9D, 62, 21, 8D, 00, 21, 9D, 00, 23
AA 353 DATA CA, 00, F1, 5D, 00, 03, B5
    , A5, 2F, 8D, 1E, 23, A5, 30, 38, E9
DE 354 DATA 18, 0D, 1F, 23, A9, A5, 2F
    , 18, 69, 42, 0D, 23, 21, B8, 69, 00
CC 355 DATA 8D, 24, 21, A5, 2F, 18, 69
    , A9, ED, 2E, 21, 98, EA, 69, 00, ED

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D6	356 DATA 2F,21,AS,2F,CA,8E,4D, 21,9B,EO,FF,DO,01,8B,8C,51	CE	383 DATA 62,42,4E,71,2C,77,67, 7C,7F,67,FF,43,3C,FF,14,8A	52	410 DATA FF,EE,FE,FF,EE,EE,FF, ED,EE,FF,EE,EE,FF,EE,EE,FF
A3	357 DATA 21,AS,AE,8D,3C,21,AS, AF,3B,EB,1B,8D,45,21,EA,7B	4D	384 DATA 69,3C,84,2A,09,62,FF, F5,2E,31,FF,3D,94,44,62,10	E9	411 DATA 85,EE,FF,83,EE,85,82, A2,CC,8D,29,1F,9D,1C,01,10
7B	358 DATA A9,34,85,01,EA,02,8B, A9,4C,20,C1,1C,A9,AE,20,C1	CF	385 DATA 09,10,09,10,07,0C,3F, CA,09,13,D4,1E,3C,EA,0F,0B	52	412 DATA 02,F7,A2,34,8D,9D,1F, 9D,0C,03,EB,03,F7,EA,EA,A2
8E	359 DATA 1C,A9,A7,20,C1,1C,A9, 20,85,02,AS,21,85,03,A0,00	DB	386 DATA 1F,0E,0A,2E,0C,53,7F, 42,04,52,1C,4A,0F,FF,0D,19	4F	413 DATA FF,9A,AB,0C,85,2D,3B, E9,01,85,FE,AB,3D,85,2E,E9
6D	360 DATA B1,02,91,2F,EE,02,DO, 02,EE,03,EE,2F,DO,02,EE,30	71	387 DATA 05,8B,0B,0D,0D,1E,09, 1B,0E,24,13,1E,11,20,15,0C	E4	414 DATA 00,85,FF,AB,EE,85,FC, A9,1E,85,FD,AD,21,0C,85,FB
1E	361 DATA AS,02,CD,C2,1C,AS,03, ED,C3,1C,90,E4,AS,2F,85,AE	61	388 DATA 13,0E,0F,2A,0B,3C,43, 23,24,11,23,57,2B,FF,12,16	E7	415 DATA 4C,62,01,0C,0C,0C,0C, 0C,0C,0C,0C,0C,0C,0C,0C,0C
C7	362 DATA AS,30,95,AF,EA,EA,AS, FF,85,AC,85,02,AB,22,85,AD	38	389 DATA 16,1E,1D,31,1F,3C,2B, 2E,9D,E7,CD,AS,FF,0C,FF,8E	FA	416 DATA 30,36,31,0C,20,0C,AB, 0F,8D,2D,0C,AB,0C,8D,21,0C
6E	363 DATA 85,03,AE,00,EB,AS,02, 1B,89,FE,85,02,9C,02,EE,03	BE	390 DATA 00,0C,0C,0C,0C,0C,9E, 32,30,36,31,0C,03,8E,2D,44	54	417 DATA AB,CE,AD,15,20,1E,AB, A2,0C,4B,C6,FC,AB,FC,0C,FF
7A	364 DATA AS,02,CE,AE,AS,03,EE, AF,9C,EA,20,9B,1E,20,CA,0B	54	391 DATA 85,AB,0C,8D,20,0C,8D, 21,0C,EA,AB,3E,85,21,4C,47	DD	418 DATA 02,02,0C,8D,8D,8D,4B, AD,2D,0C,4B,03,8D,2D,0C,CE
52	365 DATA A4,87,CB,AB,2B,8D,3F, 03,AB,57,89,3F,C3,AB,01,85	EC	392 DATA 0B,AB,0C,8D,51,AB,9D, 1C,01,EB,DO,FF,AD,34,0D,EB	9F	419 DATA FE,AS,FE,0B,FF,0C,02, C6,FF,6B,8C,AD,0C,01,FC,CB
24	366 DATA 89,8B,AB,3F,AC,07,2D, BD,FF,2D,05,FE,2C,5D,1E,9D	OF	393 DATA AA,8D,03,03,EB,0D,FF, EA,EA,AD,FF,9A,AB,0C,85,2D	9C	420 DATA 8D,0C,1B,2A,EA,EA,2D, 3C,01,01,FC,AB,2C,3C,01,01
FC	367 DATA 03,4C,87,1E,CE,87,2D, A4,0B,8D,42,6C,0C,03,8D,3B	09	394 DATA 3B,EB,01,85,FE,AD,04, 85,2C,EB,0C,85,FF,AB,0E,85	A3	421 DATA FC,81,FE,2D,3D,01,CA, 0C,FB,FO,05,91,FE,2D,3D,01
6A	368 DATA E9,1B,4C,C1,1C,0C,0C, A9,FF,85,AC,AB,22,85,AD,4C	C4	395 DATA AB,AB,AB,AB,AD,21, 0C,85,FB,4C,52,01,0C,07,8E	CB	422 DATA AB,FC,CA,AB,FC,0C,FF, 0C,0C,0C,FD,AS,FE,CB,1F,AS
6C	369 DATA 87,CC,0C,05,8B,0C,0D, 4E,4F,2D,53,41,5B,49,4E,47	6F	396 DATA 0E,0B,FF,FF,9E,32,3D, 3C,31,4C,45,53,0C,0B,8B,21	04	423 DATA FF,EB,0B,EC,CB,AS,FE, 8D,2D,0C,AB,37,85,01,2C,6C
8E	370 DATA 2D,4D,41,44,45,0C,0D, 0D,43,41,4E,27,54,2D,46,49	0D	397 DATA 23,25,22,24,26,27,0C, 4B,C6,FC,AS,FC,CB,FF,0C,02	4B	424 DATA AB,2D,0E,AD,AD,1F,8D, 1C,01,8D,0C,0B,CA,0C,FF,AD
8B	371 DATA 4E,44,2D,41,2D,43,4F, 44,45,0C,04,EB,A2,6C,AD,1E	6A	398 DATA C6,FD,6B,6D,4B,AD,2D, 0D,49,03,8D,2D,0C,0C,FE,AS	5F	425 DATA 8E,4E,34,03,4C,AE,A7, EE,EE,EE,EE,EE,EE,EE,EE,EE
7B	372 DATA 0D,04,A2,71,A0,1E,5B, 6B,8A,4C,91,1E,AB,37,85,01	76	399 DATA FE,C9,FF,0C,02,C6,FF, 6B,6D,AD,0C,01,FC,CB,6F,0D	4C	426 DATA AB,0C,AB,85,FB,85,FD, AB,0C,85,FC,AD,0C,05,FE,81
6C	373 DATA 5B,2D,12,1D,AS,05,C5, 04,8D,EE,6D,0C,AB,37,85,01	84	400 DATA 1B,EA,03,0B,2D,3C,01, 01,FC,AA,2D,3C,01,81,FC,91	EA	427 DATA FB,91,FD,CB,0C,FB,85, FC,EE,FE,AS,FC,CB,AD,0C,EF
03	374 DATA 5B,AS,FC,CB,3C,8D,0B, 6D,0C,4C,8B,FF,11,8B,8D,0C	4D	401 DATA FE,2D,3D,01,CA,0C,FB, FD,05,91,FE,2D,3D,01,AC,FC	09	428 DATA AB,0B,AA,AB,2D,8A,FF, AD,0E,AD,14,AD,9D,2D,0D,FF
A7	375 DATA 02,CA,73,8D,3B,FF,41, 2D,34,4A,4D,9C,4D,FF,3D,6C	6F	402 DATA CA,8C,FC,EC,FF,0D,02, 0C,FD,AS,FE,CB,1F,AS,FF,EB	52	429 DATA AB,01,85,2B,AS,0C,85, 2C,AB,2B,AD,0C,AC,1F,2D,CB
E3	376 DATA EC,FE,4B,34,2D,8E,8F, 47,21,82,43,39,1D,FF,EB,9C	F7	403 DATA C9,6C,CB,AS,FB,0D,2D, 0C,AB,37,85,01,2D,0C,AB,2C	76	430 DATA FF,4C,65,FE,54,5E,82, 42,4F,2D,43,52,55,4E,43,4B
0E	377 DATA 69,81,6B,7E,77,AC,5B, 1A,0B,44,19,47,81,7E,81,6A	C3	404 DATA BE,AB,AB,1F,8D,1C,21, 9D,0C,0B,CA,0C,FF,AB,EB,4D	9D	431 DATA 45,52,EE,EE,EE,EE,EE, EE,EE,EE,EE,EE,EE,EE,EE,EE
FD	378 DATA 64,82,AD,89,25,44,47, 4B,11,87,2D,64,6A,6C,1B,89	FA	405 DATA 34,03,0C,0C,8D,AD,27, ED,1C,22,9D,8D,07,CA,1C,17	8B	432 :
F9	379 DATA 3C,87,9C,2D,23,77,3B, 31,0C,CB,05,0F,0E,01,CA,13	55	406 DATA 4C,EB,07,0C,0D,7B,AD, FE,9A,0C,1B,1E,2D,01,0E,AD	8D	433 :
CE	380 DATA 07,0E,1B,1C,03,17,9B, 35,07,16,32,0F,03,16,11,0B	5B	407 DATA 0C,8D,2D,0C,8D,21,0C, AD,0C,8D,86,0C,5B,2C,44,EE	33	434 :
71	381 DATA 04,0B,0B,CA,2B,1A,CA, 15,05,12,1E,8E,2D,FF,FF,89	7A	408 DATA 2D,02,AD,0C,2D,0C,EB, AB,CF,2D,02,AD,0C,2D,0C,EB	AA	435 : TURBO CRUNCHER BY L
AD	382 DATA 8D,5C,FF,EB,5E,07,7D, 05,4D,AD,FF,82,7C,97,7E,6C	4F	409 DATA EE,FF,CB,0C,FF,0C,EE, FF,EE,EE,FF,0C,EE,FF,0C,EE	D2	436 : 28 ATKINSON DRIVE NEW

PROGRAM: ONE PART LOADER

36	10 M1=32768:M2=35712:CH=0	THE DATA STATEMENT,"	EC	39 PRINT" HIT RETURN TO SAVE	
97	11 PRINTCHR\$(144)CHR\$(147)	80	25 PRINT	COMPLETED PROGRAM"	
CB	12 POKE52,120:POKE56,120:POKE	17	26 PRINT" CONVERTS FROM HEX	D1	40 GETKEY\$:IFKEY\$<>CHR\$(13)TH
	53280,15:POKE53281,12		TO BINARY AND POKES"		EN40
94	13 PRINT	82	27 PRINT	5B	41 SYS35376
BF	14 PRINTSPC(8)CHR\$(18)"[SU,S*	C4	28 PRINT" CODE BACK TO THE	1C	42 :
	22,S1D		AREA OF MEMORY FROM"	CE	43 : DATUM S
26	15 PRINTSPC(8)CHR\$(18)"[S-,SP	84	29 PRINT		TATEMENTS :
	C22,S-1	19	30 PRINT" WHICH IT WAS PRE	16	44 :
84	16 PRINTSPC(8)CHR\$(18)"[S-,SP		VIOUSLY GENERATED."	F7	45 DATA 00,10,09,00,00,0E,41,
	CHDATA STATEMENT[SPC3,S-1]	59	31 PRINT:PRINT		B2,30,A7,9E,34,3E,30,39,00
3C	17 PRINTSPC(8)CHR\$(18)"[S-,SP	00	32 READCODE\$	89	46 DATA 00,00,50,51,0A,10,E0,
	C22,S-1	8B	33 LB=ASC(RIGHT\$(CODE\$,1))-4B		61,FB,62,69,51,6D,69,53,51
E5	18 PRINTSPC(8)CHR\$(18)"[S-]	CF	34 HB=ASC(LEFT\$(CODE\$,1))-4B:	D4	47 DATA C6,64,62,63,69,61,7D,
	TO MEMORY ROUTINE [S-]		IFHB>9THENHB=HB-7		6D,64,6B,C6,64,62,63,69,6C
4A	19 PRINTSPC(8)CHR\$(18)"[S-,SP	32	35 PRINTSPC(5)CHR\$(5)"READING	B2	48 DATA 7D,6D,63,6B,C9,95,79,
	C22,S-1		MEMORY BLOCK ...":M1:PRINTCH		6C,65,66,7B,51,37,59,52,51
22	20 PRINTSPC(8)CHR\$(18)"[S-,SP	28	36 POKEM1,HB*16+LB:M1=M1+1:CH	3C	49 DATA C9,F7,54,7B,73,C1,43,
	CS)BY LES ALLANTSPC5,S-1		=CH+HB+LB:IFM1<M2THEN32		84,92,92,92,92,92,92,92,92
50	21 PRINTSPC(8)CHR\$(18)"[S-,SP	92	37 IFCH=31622THEN39	55	50 DATA 92,92,92,92,92,92,92,92,
	C22,S-1	13	38 PRINT"CHECK SUM ERROR - CH		92,92,92,92,92,92,92,92,92
6C	22 PRINTSPC(8)CHR\$(18)"[SJ,S*		ECK DATA STATEMENT":PRINTCH	92	51 DATA 92,92,92,92,99,51,0E,
	22,SKJ		RS(19):END		5B,55,51,C9,F7,64,7B,73,43
A0	23 PRINT:PRINTCHR\$(155)			CA	52 DATA 0C,71,71,71,71,71,71,
42	24 PRINT" THIS ROUTINE READS				71,71,71,71,71,71,71,71,71

[illegible]


```

,45,52,EE,EE,4D,45,4D,33,EE
02 216 DATA A0,04,20,A9,00,A9,B5
,F8,A2,0B,BE,FC,91,F8,CB,D0
F4 217 DATA FB,EE,FC,AE,FC,E0,D0
,D0,F3,A9,0B,AA,AC,02,20,EA
2B 218 DATA FF,A9,04,A2,FC,AC,03
,20,BD,FF,A9,00,AA,AC,AC,20
4B 219 DATA D5,FF,A9,0B,AA,AA,20
,BA,FF,A9,05,A2,E7,AC,03,20
3B 220 DATA E0,FF,A9,00,20,D5,FF
,A2,00,0D,C1,03,0D,02,CF,E8
7B 221 DATA E0,30,D0,FS,A9,4C,BD
,0D,0B,A9,D0,BD,CE,CB,A9,CF
0A 222 DATA BD,CF,29,A9,36,B5,01
,A9,CB,A2,EF,AC,03,20,0D,FF
44 223 DATA A9,01,B5,20,A9,CB,B5
,2C,A9,2B,A2,00,AC,D0,20,D9
97 224 DATA FF,A9,37,B5,01,4C,0D
,CB,7B,A9,34,B5,01,AC,03,84
4F 225 DATA FB,84,FD,AA,A0,B5,FC
,A9,D0,B5,FE,01,FE,91,FD,CB
BE 226 DATA D0,FA,EE,FC,EE,FE,D0
,F3,A9,37,B5,01,5B,20,44,EE
B2 227 DATA 4C,10,CB,C0,C0,C0,4F
,4E,45,20,50,41,52,54,20,4D
5F 228 DATA 41,49,4E,4B,45,52,4E
,EE,EE,EE,EE,EE,EE,EE,EE
DF 229 :
DC 230 :
57 231 ::::::::::::::::::::::::::::::
:::
7B 232 : ONE PART MAKER BY LE
S ALLAN :
FC 233 : 29 ATKINSON DRIVE NEW
PORT IW :
5A 234 ::::::::::::::::::::::::::::::
:::

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Nursery Rhyme Land

Adventure games are a useful asset to education via a computer. Here we bring you the graphics for our own educational game.

By Margaret and Allen Webb

There's nothing that enhances an adventure game so much as some eye-catching graphics, providing that available memory allows for this indulgence.

Our Nursery Rhyme Land game is aimed at the very young and so the graphics have additional importance in keeping the interest going and also aiding recognition of locations.

In the February issue of *Your Commodore*, we brought you the loaders for the text part of this game. This month - in the final part - we are providing the graphics driver.

Getting in the picture

The method of creating a binary file is as follows:

1. Turn on or cold reset your 64.
2. Enter this line in direct mode:
POKE 44,80: POKE 80*256,0: NEW
3. Load and run Listings 3, 4 and 5 (in that order).
4. Load and Run Listing 2. Save the block starting at 8192 and finishing at 17176. Listing 1 (YC Feb 87) assumes that the file is called PICTURE BLOCK.
5. If you have already tried the textual part of the adventure on its own, don't forget to reset line 40 of the adventure booter to that given in Listing 1 (YC Feb 87).

PROGRAM: LOADER.3

```

AE 1 REM *****
33 2 REM * NURSERY RHYME LAND *
AB 3 REM * LOADER 3 *
AB 4 REM *****
10 2000 FOR L=0 TO 175: CX=L: FOR D=0 TO
    015: READ A: CX=CX+A: POKE 8192+L*
    16+D,A: NEXT D
82 2010 READ A: IF A<>CX THEN PRINT "E
    RROR IN LINE": 2040+(L*10): STO
    P
0F 2020 NEXT L: END
1E 2040 DATA 85,85,84,85,85,84,10
    1,85,84,89,101,128,86,150,80,
    89,1461
7E 2050 DATA 159,84,86,149,84,82,
    149,0,30,48,84,10,0,0,10,0,92
    5
2D 2060 DATA 0,40,0,0,40,0,0,40,0
    ,0,40,0,0,106,85,80,431
97 2070 DATA 136,128,5,84,16,0,16
    ,0,0,5,80,84,80,0,0,255,869
9A 2080 DATA 0,0,192,0,0,15,0,0,6
    3,0,15,63,0,0,63,0,411
3B 2090 DATA 0,15,0,0,192,0,0,3,0
    ,0,3,0,0,0,0,0,213
B1 2100 DATA 0,0,0,0,0,0,0,0,42,1
    70,0,136,32,2,89,101,572
C9 2110 DATA 81,8,100,5,84,0,0,4,
    20,80,15,0,4,1,67,191,641
3B 2120 DATA 0,0,0,0,15,0,0,63,19
    2,0,255,252,0,63,0,0,840
AE 2130 DATA 0,0,0,64,0,37,64,1
    49,86,84,85,149,152,89,101,10
    60
91 2140 DATA 150,101,86,128,85,10
    6,0,85,170,0,105,168,8,170,16
    0,0,1532
9D 2150 DATA 170,128,0,170,32,128
    ,170,0,0,168,10,0,160,0,0,255
    ,1391
63 2160 DATA 0,0,0,0,0,0,0,0,0,0
    ,0,3,0,0,15,0,18
60 2170 DATA 0,1,0,0,21,84,0,38
    ,101,90,37,85,85,10,101,653
EC 2180 DATA 149,2,150,86,0,170,8
    5,0,170,89,0,42,165,8,10,170,
    1295
C1 2190 DATA 2,170,0,0,170,32,1
    60,170,0,0,42,10,0,170,183,11
    09
53 2200 DATA 0,0,0,0,0,0,0,0,0,0,
    0,0,0,0,0,0,0
FE 2210 DATA 0,0,0,64,0,37,64,1
    49,86,84,85,149,152,89,101,10
    60
01 2220 DATA 150,101,86,128,85,10
    6,0,85,170,0,105,168,8,170,16
    0,0,1532
8D 2230 DATA 170,128,0,170,32,128
    ,170,0,0,168,10,0,160,0,0,255
    ,1391
5D 2240 DATA 0,0,0,0,0,0,0,0,15,0
    ,0,63,0,0,255,0,333
32 2250 DATA 0,12,1,0,0,21,84,0,3
    8,101,90,37,85,85,10,101,655
1C 2260 DATA 149,2,150,86,0,170,8
    5,0,170,89,0,42,165,8,10,170,
    1296
0D 2270 DATA 2,170,0,0,170,32,1
    60,170,0,0,42,10,0,170,181,11
    17
BF 2280 DATA 0,0,0,3,0,0,15,192
    ,0,63,252,0,15,0,0,540
8E 2290 DATA 0,0,0,64,0,37,64,1
    49,86,84,85,149,152,89,101,10
    60
31 2300 DATA 150,101,86,128,85,10
    6,0,85,170,0,105,168,8,170,16
    0,0,1532
F2 2310 DATA 170,128,0,170,32,128
    ,170,0,0,168,10,0,160,0,0,255
    ,1391
CA 2320 DATA 0,0,0,0,0,0,0,0,0,0,
    0,0,0,0,0,0,0
93 2330 DATA 0,1,0,0,21,84,0,38
    ,101,90,37,85,85,10,101,653
BF 2340 DATA 149,2,170,150,0,37,8
    5,0,10,89,0,2,149,8,0,154,100
    5
65 2350 DATA 2,170,0,0,170,32,1
    60,170,0,0,42,10,0,170,151,10
    77
F2 2360 DATA 0,0,0,0,0,0,0,0,0,0,
    0,0,0,0,0,0,0
0B 2370 DATA 0,0,0,62,0,3,250,0
    ,15,250,0,63,254,3,255,1155

```


[illegible]

85,90
85,85
239,
39,10
55,25
0,0,2
0,0,1
64,1
85,9
149,1
45,18
192,8
235,
40,25
0,0,
1,85,
47,10
5,213
167,1
235,
5,254
0,0,
5,85,
0,105
102,
252,
214,1
52,19
64,1
85,9
149,1
45,18
192,8
235,
40,25
53,19
64,1
01,10
85,10
70,16
2,128
0,255
0,0,
84,6
85,93
85,65
06
2,160
47
0,2,
1002
0,3,
171,1
130,1
0,1,
21,0

```

FB 3650 DATA170,0,170,170,0,170,
    234,0,171,234,0,171,234,0,171
    ,234,2129
EF 3660 DATA0,171,234,0,168,234,
    0,171,233,85,171,229,85,171,2
    13,85,2250
GB 3670 DATA171,85,85,169,85,85,
    165,85,85,149,85,85,85,85,85,
    255,1844
HB 3680 DATA0,0,0,0,0,10,0,2,170
    ,0,170,170,0,170,170,0,862
AB 3690 DATA170,170,0,170,170,0,
    170,170,0,170,170,0,170,170,0
    ,170,1870
JB 3700 DATA170,0,170,170,0,170,
    170,85,106,170,85,90,170,85,8
    6,170,1897
FB 3710 DATA85,85,170,85,85,106,
    85,85,90,85,85,86,85,85,85,19
    1,1578
GB 3720 DATA0,0,0,160,0,0,170,12
    8,0,170,170,0,170,170,0,170,1

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68 3730 DATA170,0,170,170,0,170,
    234,0,171,234,0,171,234,0,171
    ,234,2129
9F 3740 DATA0,171,234,0,168,234,
    0,171,233,85,171,229,85,171,2
    13,85,2250
D8 3750 DATA171,85,85,169,85,85,
    165,85,85,149,85,85,85,85,85,
    255,1844
98 3760 DATA0,0,0,0,0,10,0,2,170
    ,0,170,170,0,170,170,0,862
0A 3770 DATA170,170,0,170,170,0,
    170,170,0,170,170,0,170,170,8
    5,90,1875
89 3780 DATA170,213,85,170,197,8
    5,170,221,85,106,215,218,234,
    95,214,234,2703
1B 3790 DATA85,213,234,95,213,23
    4,85,85,90,85,85,86,85,85,85,
    183,2018
95 3800 DATA0,0,0,0,0,0,0,0,0,0,
    0,0,0,0,0,0,0,0

```

PROGRAM: LISTING 2

```

1 REM*****
2 REM*          LISTING 2          *
3 REM*  BINARY FILE SAVER  *
4 REM*****
10 INPUT"START ADDRESS";SA
20 INPUT "END ADDRESS";FA
30 INPUT "DEVICE";DE
40 INPUT "FILE NAME";FIS$
50 POKE194,SA/256:POKE193,SA-PEEK(194)*256
60 POKE175,FA/256:POKE174,FA-PEEK(175)*256
70 L=LEN(FIS$)
80 FORI=1TOL:POKE1023+I,ASC(MID$(FIS$,I,1))
: NEXT
90 POKE 187,0:POKE188,4:POKE183,L:POKE186,
DE:SYS62954

```

PROGRAM: LOADER.4

```

01 1 REM *****
02 2 REM * NURSERY RHYME LAND *
03 3 REM * LOADER 4 *
04 4 REM *****
05 2020 FOR L=0TO176:GX=0:FOR D=0
06 015:READ A:GX=GX+A:POKE1100B+L
07 *16+D,A:NEXT D
08 2010 READ A:IF A<>CXTHENPRINT"E
09 RROR IN LINE":GOTO*(L*10)+10
10 P
11 0F 2020 NEXT L:END
12 75 2040 DATA 0,0,0,0,0,0,0,0,65
13 ,4,16,65,4,16,65,255
14 2050 DATA 65,65,4,16,65,4,1
15 6,161,40,24,169,170,42,170,17
16 0,1285
17 76 2060 DATA 170,34,169,170,170,4
18 2,162,174,43,232,255,175,250,
19 255,255,255,2810

```

```

E8 2070 DATA255,255,254,255,255,
255,255,255,255,255,255,2
55,255,255,255,4078
1C 2080 DATA0,0,0,0,0,0,0,0,0,0
4,16,55,4,16,25,255
85 2090 DATA95,95,55,4,16,55,4,1
6,129,36,25,161,170,42,170,17
0,1244
CD 2100 DATA170,42,170,162,40,13
0,40,162,139,162,175,171,235,
191,234,255,2495
2D 2110 DATA255,255,255,255,255,
255,255,255,255,255,255,2
55,255,255,191,4316
3B 2120 DATA0,0,0,0,15,0,0,63,19
2,0,255,252,0,63,0,0,840
4E 2130 DATA0,0,0,0,54,0,37,54,1
42,86,84,85,149,152,89,101,12
60

```


91	2140 DATA160,101,86,128,85,10 6,0,85,170,0,105,168,8,170,16 0,0,1532	EF	2480 DATA0,0,0,85,85,64,85,85 ,85,105,85,149,89,86,85,86,11 74	17	2790 DATA3,252,32,3,255,0,15, 255,0,15,255,192,63,255,240,2 55,2090
9D	2150 DATA170,129,0,170,32,129 ,170,0,0,168,10,0,160,0,0,255 ,1391	27	2490 DATA86,106,86,89,149,149 ,149,149,133,166,81,129,166,6 4,128,170,2000	74	2800 DATA0,0,0,85,85,64,85,85 ,85,105,85,149,89,86,85,86,11 74
9B	2160 DATA0,0,0,0,0,0,0,0,0,0 0,15,0,0,63,0,78	E0	2500 DATA2,128,40,2,32,40,2,3 2,40,2,0,42,2,0,42,8,414	68	2810 DATA86,106,86,89,149,149 ,149,149,133,166,81,129,166,6 4,128,170,2000
9F	2170 DATA0,3,1,0,0,1,89,0,21, 149,86,38,85,85,10,89,657	A4	2510 DATA0,170,8,0,138,0,2,0, 128,0,0,32,0,0,0,181,659	B2	2820 DATA2,128,40,2,32,40,2,3 2,40,2,0,42,2,0,42,8,414
7D	2180 DATA101,10,149,89,2,169, 85,2,170,85,0,170,105,160,42, 170,1509	27	2520 DATA0,0,0,85,85,64,85,85 ,85,105,85,149,89,86,85,86,11 74	8F	2830 DATA0,170,8,0,138,0,2,0, 128,0,0,32,0,0,0,179,657
8D	2190 DATA0,2,170,2,8,170,0,0, 170,0,160,170,0,0,10,247,1109	0F	2530 DATA86,106,86,89,149,149 ,149,149,133,166,81,129,166,6 4,128,170,2000	D0	2840 DATA0,0,0,0,0,0,0,0,0,0, 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
53	2200 DATA0,0,0,0,0,0,0,0,0,0, 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0	8B	2540 DATA2,128,40,2,32,40,2,3 2,40,2,0,42,2,0,42,8,414	9E	2850 DATA0,0,0,0,0,0,0,0,0,15,2 52,0,63,247,192,255,253,1277
8F	2210 DATA0,0,0,0,0,0,0,0,0,0, 0,0,255,0,15,255,525	9D	2550 DATA0,170,8,0,138,0,2,0, 128,0,0,32,0,0,0,255,733	21	2860 DATA252,255,255,127,247, 255,250,255,255,170,255,95,23 4,255,255,250,3665
3A	2220 DATA240,255,119,254,255, 253,254,223,255,250,127,254,1 70,255,234,170,3568	38	2560 DATA0,0,0,0,0,0,80,1,84, 133,149,85,149,102,90,154,102 7	FE	2870 DATA253,255,250,255,253, 254,255,215,250,255,127,170,2 55,250,170,255,3724
6D	2230 DATA255,170,170,255,170, 170,127,234,170,223,250,170,2 55,254,170,255,3298	D8	2570 DATA101,165,105,89,148,1 65,86,148,164,20,160,160,0,16 0,191,192,2054	FB	2880 DATA0,0,0,0,0,0,0,0,0,0, 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
7B	2240 DATA0,0,0,0,0,0,0,0,0,0, 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0	76	2580 DATA40,143,192,40,47,240 ,40,3,240,40,15,240,10,15,252 ,8,1565	1E	2890 DATA0,0,0,0,0,0,0,0,0,0, 0,0,255,0,15,255,525
05	2250 DATA0,0,0,0,0,0,0,0,0,0,63 ,240,3,223,252,63,127,971	03	2590 DATA3,252,32,3,255,0,15, 255,0,15,255,192,63,255,240,1 91,2026	50	2900 DATA240,191,221,255,191, 127,255,175,255,247,170,191,2 53,170,171,255,3367
A3	2260 DATA255,253,255,255,175, 255,223,170,255,255,171,245,2 55,175,255,255,3707	E1	2600 DATA0,0,0,0,0,0,0,0,0,0, 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0	6E	2910 DATA170,170,255,170,170, 255,170,171,253,170,175,247,1 70,191,255,191,3183
E7	2270 DATA175,255,255,191,127, 255,175,215,255,170,253,255,1 70,175,255,191,3372	35	2610 DATA0,0,0,0,0,0,0,0,15,2 52,0,63,247,192,255,253,1277	7E	2920 DATA0,0,0,0,0,0,0,0,0,3, 0,0,15,240,0,63,321
A3	2280 DATA0,0,0,0,0,0,0,0,0,0, 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0	80	2620 DATA252,255,255,127,247, 255,250,255,255,170,255,95,23 4,255,255,250,3665	09	2930 DATA252,0,15,192,0,0,0,0, 0,0,0,0,0,0,21,85,565
43	2290 DATA0,0,0,0,0,0,0,0,15,2 52,0,63,247,192,255,253,1277	B7	2630 DATA255,255,250,255,253, 254,255,215,250,255,127,170,2 55,250,170,255,3724	24	2940 DATA64,85,89,80,85,85,85 ,85,85,85,85,105,85,90,85,85, 1364
5A	2300 DATA252,255,255,127,247, 255,250,255,255,170,255,95,23 4,255,255,250,3665	09	2640 DATA0,0,0,0,0,0,0,0,0,0, 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0	2D	2950 DATA85,149,85,85,101,85, 85,89,85,85,85,85,85,85,85,25 5,1614
E0	2310 DATA255,255,250,255,253, 254,255,215,250,255,127,170,2 55,250,170,255,3724	E9	2650 DATA0,0,0,0,0,0,0,0,0,0, 0,0,255,0,15,255,525	73	2960 DATA0,0,0,0,0,0,0,0,0,0, 0,63,0,0,255,0,318
CA	2320 DATA0,0,0,0,0,0,0,0,0,0, 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0	21	2660 DATA240,191,221,255,191, 127,255,175,255,247,170,191,2 53,170,171,255,3367	12	2970 DATA0,15,0,0,0,0,0,0,0,0, 0,0,0,0,21,0,1,37
F4	2330 DATA0,0,0,0,0,0,0,0,0,0, 0,0,255,0,15,255,525	D9	2670 DATA170,170,255,170,170, 255,170,171,253,170,175,247,1 70,191,255,183,3175	4F	2980 DATA85,0,5,85,0,21,85,85 ,85,89,85,85,101,85,85,149,11 30
F2	2340 DATA240,191,221,255,191, 127,255,175,255,247,170,191,2 53,170,171,255,3367	D6	2680 DATA0,0,0,0,0,0,21,64,5, 85,86,82,165,153,86,90,837	6F	2990 DATA85,85,85,85,89,85,10 1,165,89,85,85,101,85,85,85,1 83,1578
1E	2350 DATA170,170,255,170,170, 255,170,171,253,170,175,247,1 70,191,255,183,3175	E7	2690 DATA89,166,22,101,105,22 ,149,90,10,20,26,10,0,10,40,0 ,860	E3	3000 DATA0,0,0,0,0,0,0,0,0,0, 0,6,0,0,86,0,82
F2	2360 DATA0,0,0,0,0,0,0,0,0,0, 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0	3A	2700 DATA51,40,0,255,40,3,206 ,40,3,206,160,15,207,32,63,15 ,1336	E1	3010 DATA1,90,0,5,90,0,21,90, 0,21,106,0,85,170,1,85,765
8C	2370 DATA0,0,0,0,0,0,0,0,0,0, 0,0,255,0,15,255,525	D8	2710 DATA8,63,15,0,15,192,0,6 3,240,0,255,192,3,255,240,255 ,1796	7B	3020 DATA170,5,85,170,5,85,17 0,21,85,106,85,85,90,85,85,90 ,1422
15	2380 DATA240,255,119,254,255, 253,254,223,255,250,127,254,1 70,255,234,170,3568	8C	2720 DATA0,0,0,85,64,4,101,14 9,21,101,175,255,149,111,255, 149,1618	41	3030 DATA85,85,80,85,85,86,85 ,85,85,85,85,85,85,85,85,255, 1536
74	2390 DATA255,170,170,255,170, 170,127,234,170,223,250,170,2 55,254,170,255,3298	9B	2730 DATA15,255,80,14,255,0,1 5,255,0,14,255,239,15,255,239 ,206,2112	CA	3040 DATA0,0,0,0,0,0,0,0,0,15 0,0,0,149,0,0,149,458
1A	2400 DATA0,0,0,0,0,0,0,0,0,0, 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0	C4	2740 DATA255,187,255,255,251, 255,215,251,255,215,187,255,2 15,251,255,215,3772	95	3050 DATA64,0,85,80,0,85,84,0 ,85,84,0,85,85,0,149,85,971
80	2410 DATA0,0,0,0,0,0,0,0,0,63 ,240,3,223,252,63,127,971	7E	2750 DATA239,255,215,239,192, 215,0,0,0,0,0,0,0,0,0,191,154 6	F7	3060 DATA64,165,85,80,165,85, 80,169,85,84,170,85,85,170,85 ,85,1742
06	2420 DATA255,253,255,255,175, 255,223,170,255,255,171,245,2 55,175,255,255,3707	40	2760 DATA0,0,0,0,0,0,80,1,84, 133,149,85,149,102,90,154,102 7	44	3070 DATA170,149,85,170,165,8 5,170,169,85,170,170,149,106, 170,149,191,2353
82	2430 DATA175,255,255,191,127, 255,175,215,255,170,253,255,1 70,175,255,191,3372	D0	2770 DATA101,165,105,89,148,1 65,86,148,164,20,160,160,0,16 0,191,192,2054	C7	3080 DATA0,0,0,0,0,0,0,0,0,0, 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
15	2440 DATA0,0,0,0,0,0,0,21,64,5, 85,86,82,165,153,86,90,837	CE	2780 DATA40,143,192,40,47,240 ,40,3,240,40,15,240,10,15,252 ,8,1565	19	3090 DATA0,0,0,0,0,0,0,0,0,0, 3,0,0,3,0,0,6
8C	2450 DATA89,166,22,101,105,22 ,149,90,10,20,26,10,0,10,40,0 ,860			CF	3100 DATA6,0,0,86,0,1,90,0,5, 90,0,21,90,0,21,106,516
FA	2460 DATA50,40,0,242,40,3,200 ,40,3,192,160,15,192,32,63,0, 1272			CF	3110 DATA0,85,170,1,85,170,5, 85,170,5,85,170,21,85,106,255 ,1498
EB	2470 DATA8,63,0,0,15,192,0,63 ,240,0,255,192,3,255,240,255, 1781				

1,252
 1,15,
 40,2
 85,85
 85,11
 3,149
 86,6
 0,2,3
 2,0,
 0,0,
 15,2
 277
 247,
 85,23
 253,
 170,2
 0,0,
 0,0,
 191,
 191,2
 170,
 247,1
 0,3,
 0,0,0
 86,85
 5,85,
 1,85,
 85,25
 0,0,
 0,0,0
 85,85
 49,11
 85,10
 85,1
 0,0,
 1,90,
 65
 85,17
 85,90
 86,85
 255,
 0,16
 84,0
 971
 5,85,
 70,85
 165,8
 106,
 0,0,
 0,0,
 0,5,
 70,5,
 6,255

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169,127,170,165,255,168,5,127
,0,1,127,2301
DA 3470 DATA0,0,87,5,0,21,0,0,5,
0,1,1,0,0,0,183,303
FD 3480 DATA0,0,0,0,0,0,0,4,0,0,
68,1,0,85,17,0,175
B1 3490 DATA85,221,116,87,213,95
,119,85,117,119,90,85,117,11
,87,93,1840
0C 3500 DATA127,87,93,96,213,221
,124,93,213,191,93,85,188,85,
85,240,2234
53 3510 DATA85,90,192,85,87,240,
101,103,252,122,127,192,127,2
55,0,255,2313
5F 3520 DATA0,0,0,0,0,0,4,85,17,
4,85,81,7,117,93,5,478
68 3530 DATA119,93,5,215,85,201,
85,87,253,93,87,254,93,85,3,2
13,1971
6D 3540 DATA213,15,149,117,3,185
,117,0,123,119,3,119,87,15,21
3,87,1565
E0 3550 DATA3,230,85,0,53,101,0,
5,101,0,247,93,3,250,223,191,
1585
EA 3560 DATA0,0,0,0,0,0,68,65,16
,69,85,16,117,93,208,117,854
E6 3570 DATA221,80,85,215,80,213
,85,99,213,117,127,85,117,191
,87,87,2102
74 3580 DATA192,93,86,240,93,110
,192,221,237,0,213,221,192,21
3,87,240,2630
BE 3590 DATA85,155,192,89,92,0,8
9,80,0,117,223,0,247,175,192,
255,1991
DA 3600 DATA0,0,0,0,0,0,16,0,6
4,17,0,68,85,0,119,369
14 3610 DATA85,0,87,213,29,85,22
1,245,165,221,93,249,93,85,25
3,117,2241
55 3620 DATA213,9,117,213,61,119
,87,254,87,117,62,85,117,15,8
5,85,1726
C7 3630 DATA3,165,85,15,213,85,6
3,217,89,3,253,173,0,255,253,
179,2051

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84 3640 DATA170,154,106,170,154,
    126,166,154,166,166,154,166,1
    66,154,166,166,2484
CD 3650 DATA154,170,102,169,170,
    105,169,170,105,169,170,105,1
    69,171,105,169,2372
A0 3660 DATA171,169,169,175,170,
    106,111,170,106,175,170,128,1
    75,8,0,5,2008
36 3670 DATA0,0,21,0,0,85,0,1,84
    ,0,0,85,0,0,21,255,552
6F 3680 DATA154,170,170,154,154,
    105,153,154,105,153,170,105,1
    54,166,105,154,2326
4F 3690 DATA102,154,166,102,170,
    166,102,154,166,102,154,230,1
    02,154,234,102,2360
E3 3700 DATA154,234,102,166,250,
    102,166,250,166,166,250,169,1
    66,80,2,170,2593
57 3710 DATA84,0,168,0,0,0,0,0,0
    ,64,0,0,80,0,0,191,567
CF 3720 DATA255,255,255,234,170,
    255,150,149,191,89,85,111,169
    ,89,110,85,2652
4E 3730 DATA86,158,85,150,109,10
    2,150,89,86,37,81,218,38,64,2
    16,41,1710
AA 3740 DATA64,216,9,64,232,9,72
    ,232,9,34,232,137,136,202,42,
    34,1724
CA 3750 DATA200,136,136,34,34,34
    ,136,136,136,34,34,34,136,136
    ,136,255,1747
57 3760 DATA255,255,255,253,127,
    255,182,106,255,89,85,191,149
    ,1,174,148,2780
85 3770 DATA1,109,148,0,93,148,0
    ,93,144,1,93,144,1,85,84,1,11
    45
05 3780 DATA101,100,1,101,100,1,
    86,80,137,86,82,34,21,136,136
    ,137,1339
81 3790 DATA34,34,34,136,136,136
    ,34,34,34,136,136,136,34,34,3
    4,183,1305
95 3800 DATA0,0,0,0,0,0,0,0,0,0,
    0,0,0,0,0,0,0,0,0,0,0,0,0,0,0

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```

0E 1 REM *****
33 2 REM * NURSERY RHYME LAND *
AA 3 REM *          LOADER 5          *
AB 4 REM *****
95 2000 FORL=OT0209: CX=0: FORD=OT
    015: READA: CX=CX+A: POKE13824+L
    *16+D, A: NEXID
B2 2010 READA: IFA<>CXTHENPRINT"E
    RROR IN LINE"; 2040+(L*10): STO
    P
0F 2020 NEXITL:END
AB 2040 DATA255,255,255,191,239,
    254,111,171,250,91,150,229,10
    1,101,213,101,2967
42 2050 DATA101,213,85,105,89,89
    ,105,89,89,89,89,89,89,85,85,
    85,1576
80 2060 DATAB5,85,88,148,34,34,3
    4,136,136,136,34,34,34,136,13
    6,136,1426
35 2070 DATA34,34,34,140,136,184
    ,63,34,242,255,203,252,0,0,0,
    255,1866
58 2080 DATA255,255,255,255,170,
    171,254,86,150,249,85,101,185
    ,101,106,182,2860
80 2090 DATA149,85,121,150,85,10
    1,150,153,69,88,149,1,152,167
    ,1,104,1725
EC 2100 DATA39,1,96,39,33,96,43,
    136,96,43,34,98,43,136,168,16
    3,1264
72 2110 DATA34,34,35,136,136,136
    ,34,34,34,136,136,136,34,34,3
    4,255,1378
29 2120 DATA255,255,255,253,127,
    255,182,106,255,89,85,191,149
    ,1,174,148,2780
53 2130 DATA1,109,148,0,93,148,0
    ,93,144,1,93,144,1,85,84,1,11
    45
3 2140 DATA101,100,1,101,100,1,
    86,80,137,86,82,34,21,136,136
    ,137,1339
58 2150 DATA34,34,34,136,136,136
    ,34,34,34,136,136,136,34,34,3
    4,255,1377
61 2160 DATA255,255,255,253,127,
    255,182,106,255,89,85,191,149
    ,1,174,148,2780
98 2170 DATA1,109,148,0,93,148,0
    ,93,144,1,93,144,1,85,84,1,11
    45
86 2180 DATA101,100,1,101,100,1,
    86,80,137,86,82,34,21,136,136
    ,137,1339
53 2190 DATA34,34,34,136,136,136
    ,34,34,34,136,136,136,34,34,3
    4,193,1305
89 2200 DATA255,255,255,234,170,
    255,150,149,191,89,85,111,169
    ,89,110,85,2652
C8 2210 DATAB6,158,85,150,109,10
    2,150,89,86,37,81,218,38,64,2
    16,41,1710
D8 2220 DATA64,216,9,64,232,9,72
    ,232,9,34,232,137,136,202,42,
    34,1724
AC 2230 DATA200,136,136,34,34,34
    ,136,136,136,34,34,34,136,136
    ,136,255,1747
86 2240 DATA255,255,255,255,170,
    171,254,86,150,249,85,101,185
    ,101,106,182,2860
50 2250 DATA149,85,121,150,85,10
    1,150,153,69,88,149,1,152,167
    ,1,104,1725
4C 2260 DATA39,1,96,39,33,96,43,
    136,96,43,34,98,43,136,168,16
    3,1264
D3 2270 DATA34,34,35,136,136,136

```

,34,34,34,136,136,136,34,34,34,191,1314

C9 2280 DATA255,255,255,253,127,255,182,106,255,89,85,191,149,1,174,148,2780

43 2290 DATA1,109,148,0,93,148,0,93,144,1,93,144,1,85,84,1,1145

C3 2300 DATA101,100,1,101,100,1,86,80,137,86,82,34,21,136,136,137,1339

31 2310 DATA34,34,34,136,136,136,34,34,34,255,1377

B2 2320 DATA255,255,255,191,239,254,111,171,250,91,150,229,101,101,213,101,2967

C9 2330 DATA101,213,85,105,89,89,105,89,89,89,89,89,89,85,85,85,1576

B4 2340 DATA85,85,88,148,34,34,34,136,136,136,34,34,34,136,136,136,1426

BA 2350 DATA34,34,34,140,136,184,63,34,242,255,203,252,0,0,0,182,1793

60 2360 DATA255,255,255,253,127,255,182,106,255,89,85,191,149,1,174,148,2780

0A 2370 DATA1,109,148,0,93,148,0,93,144,1,93,144,1,85,84,1,1145

06 2380 DATA101,100,1,101,100,1,86,80,137,86,82,34,21,136,136,137,1339

41 2390 DATA34,34,34,136,136,136,34,34,34,255,1377

2C 2400 DATA255,255,255,234,170,255,150,149,191,89,85,111,169,89,110,85,2652

B8 2410 DATA86,158,85,150,109,102,150,89,86,37,81,218,38,64,216,41,1710

51 2420 DATA64,216,9,64,232,9,72,232,9,34,232,137,136,202,42,34,1724

C1 2430 DATA200,136,136,34,34,34,136,136,136,34,34,34,136,136,136,191,1683

14 2440 DATA255,255,255,234,170,255,150,149,191,89,85,111,169,89,110,85,2652

73 2450 DATA86,158,85,150,109,102,150,89,86,37,81,218,38,64,216,41,1710

49 2460 DATA64,216,9,64,232,9,72,232,9,34,232,137,136,202,42,34,1724

2B 2470 DATA200,136,136,34,34,34,136,136,136,34,34,34,136,136,136,255,1747

E2 2480 DATA255,255,255,191,239,254,111,171,250,91,150,229,101,101,213,101,2967

69 2490 DATA101,213,85,105,89,89,105,89,89,89,89,89,85,85,85,1576

94 2500 DATA85,85,88,148,34,34,34,136,136,136,34,34,34,136,136,136,1426

CB 2510 DATA34,34,34,140,136,184,63,34,242,255,203,252,0,0,0,179,1790

80 2520 DATA255,255,255,253,127,255,182,106,255,89,85,191,149,1,174,148,2780

EA 2530 DATA1,109,148,0,93,148,0,93,144,1,93,144,1,85,84,1,1145

66 2540 DATA101,100,1,101,100,1,

```


86, 80, 137, 86, 82, 34, 21, 136, 136
, 137, 1339
A1 2550 DATA34, 34, 34, 136, 136, 136
, 34, 34, 34, 136, 136, 136, 34, 34, 3
4, 255, 1377
B3 2560 DATA255, 255, 255, 234, 170,
255, 150, 149, 191, 89, 85, 111, 169
, 89, 110, 85, 2652
7A 2570 DATA85, 150, 85, 150, 109, 10
2, 150, 89, 86, 37, 81, 218, 38, 64, 2
16, 41, 1710
CE 2580 DATA64, 216, 9, 64, 232, 9, 72
, 232, 9, 34, 232, 137, 136, 202, 42
34, 1724
BE 2590 DATA200, 136, 136, 34, 34, 34
, 136, 136, 136, 34, 34, 34, 136, 136
, 136, 191, 1683
11 2600 DATA255, 255, 255, 255, 235,
255, 254, 150, 169, 249, 85, 85, 229
, 85, 81, 213, 3111
35 2610 DATA153, 80, 213, 153, 64, 21
7, 153, 64, 89, 149, 64, 89, 150, 64,
89, 150, 1941
A7 2620 DATA64, 89, 150, 64, 85, 86, 7
2, 101, 101, 34, 101, 101, 136, 101,
101, 34, 1420
AD 2630 DATA103, 100, 136, 151, 86, 3
4, 151, 84, 136, 159, 82, 34, 127, 21
6, 136, 255, 1990
BB 2640 DATA255, 255, 255, 254, 191,
255, 213, 111, 255, 89, 91, 253, 22,
86, 245, 5, 2835
BB 2650 DATA149, 181, 5, 153, 117, 1,
153, 117, 1, 153, 85, 1, 153, 89, 1, 8
9, 1448
92 2660 DATA89, 1, 89, 153, 137, 89, 1
53, 34, 89, 153, 136, 89, 153, 34, 89
, 149, 1637
72 2670 DATA136, 89, 149, 34, 21, 149
, 136, 149, 149, 34, 21, 149, 136, 14
9, 85, 183, 1769
31 2680 DATA0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0
49 2690 DATA0, 0, 0, 0, 40, 32, 20, 170
, 170, 85, 106, 161, 85, 105, 169, 85
, 1228
16 2700 DATA93, 117, 105, 93, 117, 90
, 157, 93, 170, 117, 85, 106, 85, 85,
89, 85, 1687
6C 2710 DATA85, 93, 95, 85, 93, 85, 85
, 119, 85, 85, 85, 85, 85, 85, 85, 255
, 1580
B7 2720 DATA0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 32, 32
3B 2730 DATA0, 0, 168, 0, 168, 42, 22,
160, 166, 85, 168, 53, 86, 192, 117,
21, 1448
6E 2740 DATA212, 117, 84, 117, 220, 6
9, 69, 85, 84, 85, 84, 85, 69, 85, 85,
85, 1535
26 2750 DATA81, 69, 17, 85, 21, 85, 85
, 81, 69, 85, 85, 85, 85, 85, 85, 191,
1294
A5 2760 DATA0, 0, 0, 160, 0, 0, 170, 12
8, 0, 170, 170, 0, 170, 170, 0, 170, 1
308
9C 2770 DATA170, 0, 170, 170, 0, 170,
234, 0, 171, 234, 0, 171, 234, 0, 171
, 234, 2129
E3 2780 DATA0, 171, 234, 0, 168, 234,
0, 171, 233, 85, 171, 229, 85, 171, 2
13, 85, 2250
8C 2790 DATA171, 85, 85, 169, 85, 85,
165, 85, 85, 149, 85, 85, 85, 85, 85,
255, 1844
4C 2800 DATA0, 0, 0, 0, 0, 10, 0, 2, 170
, 0, 170, 170, 0, 170, 170, 0, 862
9E 2810 DATA170, 170, 0, 170, 170, 0,
170, 170, 0, 170, 170, 0, 170, 170, 8
5, 90, 1875
FE 2820 DATA170, 213, 86, 170, 197, 8

```


YOU ARE STANDING IN A LARGE MEADOW. THE
SUN IS SHINING AND THE SKY IS BLUE. THE
SOME RABBITS ARE NIBBLING THE
GRASS AROUND. THERE IS A
GATE IN THE HEDGE TO THE WEST

I CAN ALSO SEE
A SILVER BELL-

YOU MAY GO TO THE
WEST



YOU ARE CARRYING
NOTHING

	,32,141,2101	B4	3820 DATA5,5,13,13,13,13,13,13,13,13,1,1,1,1,1,1,1,9,116	91	4000 DATA14,8,8,8,8,8,6,14,8,8,8,8,15,15,15,15,15,173
93	3680 DATA2,208,169,2,141,16,208,96,172,62,3,136,185,176,64,141,1781	A5	3830 DATA13,1,13,13,13,9,6,13,9,6,13,1,1,9,8,5,133	54	4010 DATA15,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,15
56	3690 DATA37,208,185,26,65,141,38,208,185,229,64,141,39,208,141,40,1955	CE	3840 DATA0,13,5,5,0,15,15,15,15,15,15,15,15,9,6,173	70	4020 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
B6	3700 DATA208,96,174,62,3,202,189,222,66,133,251,189,169,66,133,252,2415	B7	3850 DATA14,3,3,13,13,6,14,7,7,7,7,6,14,7,7,7,135	7E	4030 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
B7	3710 DATA160,0,140,133,3,177,251,141,134,2,173,133,3,24,105,10,1589	A4	3860 DATA7,6,14,7,7,7,7,6,6,6,6,6,6,6,6,6,6,109	CD	4040 DATA0,5,5,5,0,0,0,6,14,1,1,1,1,18,32,32,121
AC	3720 DATA170,150,27,24,32,240,255,169,141,160,66,32,30,171,238,133,2048	B8	3870 DATA6,6,6,6,6,6,6,6,6,6,6,6,6,6,6,6,6,6	44	4050 DATA32,32,32,32,32,32,32,32,32,32,32,32,146,0,183,183,183,1198
DC	3730 DATA3,172,133,3,192,5,208,221,162,15,160,27,24,32,240,255,1852	4A	3880 DATA6,6,8,0,8,6,6,6,8,8,8,6,6,8,8,8,114	DS	4060 DATA183,183,183,183,183,183,183,183,183,0,65,65,65,65,65,65,1919
AC	3740 DATA172,133,3,177,251,141,134,2,169,156,160,66,32,30,171,96,1893	0C	3890 DATA8,6,5,8,8,8,8,8,6,6,8,8,8,8,6,6,8,116	98	4070 DATA65,65,65,65,65,65,65,65,65,65,65,65,65,65,65,65,1040
BF	3750 DATA5,5,5,13,5,8,8,5,5,5,5,5,5,5,5,5,94	2D	3900 DATA8,8,6,6,8,8,8,8,8,6,14,15,15,15,15,6,154	18	4080 DATA65,65,65,65,65,65,65,65,65,65,65,65,65,65,65,65,1049
25	3760 DATA5,5,8,8,8,8,1,5,5,5,5,5,5,5,5,5,5,88	99	3910 DATA14,15,15,15,15,0,0,4,10,7,7,1,2,2,2,0,109	42	4090 DATA66,66,66,66,66,66,66,66,66,66,66,66,66,66,66,66,1088
4D	3770 DATA5,13,13,13,13,9,9,5,13,13,11,11,11,11,11,172	A6	3920 DATA0,1,3,3,3,3,3,1,12,1,2,12,12,12,1,12,102	65	4100 DATA91,97,103,109,115,121,1,127,133,139,145,151,157,163,169,175,181,2176
0C	3780 DATA11,11,11,11,5,9,9,9,9,9,9,9,13,9,9,9,152	11	3930 DATA12,12,12,6,14,2,2,12,12,6,14,15,15,15,15,6,170	B7	4110 DATA187,193,199,205,211,217,223,229,235,241,247,253,3,9,15,21,2688
E2	3790 DATA9,9,9,9,9,15,10,14,15,15,5,9,12,9,12,170	52	3940 DATA14,3,15,15,15,6,14,3,15,15,15,6,14,3,15,15,183	22	4120 DATA27,33,39,45,51,57,63,69,75,81,87,93,99,105,111,117,1152
03	3800 DATA12,8,8,12,8,8,5,5,5,5,13,8,6,9,9,12,133	85	3950 DATA15,6,14,13,13,13,13,6,14,13,13,13,13,13,13,13,13,102	F2	4130 DATA123,129,135,0,0,0,0,0,0,0,0,0,0,0,0,0,0,387
4C	3810 DATA12,12,12,12,12,12,12,12,12,12,13,7,1,1,1,5,5,141	20	3960 DATA13,13,13,6,14,13,13,13,13,6,14,13,13,13,13,13,13,109		
		CF	3970 DATA14,3,15,15,15,6,14,3,3,3,3,6,14,3,3,3,123		
		FE	3980 DATA3,6,14,3,3,3,3,6,14,3,3,3,3,6,14,7,94		
		6B	3990 DATA7,7,7,0,0,0,0,12,12,6,14,8,8,8,8,6,103		

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Popper

*On a light-hearted note, we bring you a game featuring
Popper the green pea. Have fun!*

By Ian Potts

As Popper the popping pea you must explore the sixty-four rooms of each of the Green Giant's castles in search of the Popper juniors that he has kidnapped.

Each castle has eight floors, each eight rooms wide and on each floor you will find a junior Popper. When you have found all eight Poppers in each castle you must put them back into their pod.

However life is not all that easy because the Green Giant has sent many baddies to hinder your progress.

To get from one floor of the castle to another you must pop through a hole in the floor, but make sure that you have found the Popper junior on that floor because there is no way back up again. Beware of multiple holes positioned beneath each other because you will be unable to find all the Popper juniors and put them in their pod.

When you get all the Poppers in the pod go on to the next castle to rescue even more poppers from the clutches of the Green Giant.

Controls for Play

To move Popper about the castle use a joystick in port 2. Press fire to start a game and push left and right to guide Popper.

To load Popper, press Shift and Run/Stop and press PLAY on the tape deck. The game will load and run automatically.

Note

To type in the game, please use the *Your Commodore Hex Data Entry Program*. Check the Contents page to find out exactly where it is in this issue.

YC

PROGRAM: POPPER

USE HEX DATA ENTRY TO TYPE THIS IN.

```
0801 22 08 0A 00 8B 41 B2 30 :EB 09C1 20 EF 09 60 CE 55 0E A9 :07
0809 A7 41 B2 31 3A 93 22 50 :0D 09C9 00 8D 51 0E A9 02 8D 4F :89
0811 4F 50 20 47 52 41 50 48 :0B 09D1 0E AD 10 D0 29 01 D0 15 :D3
0819 49 43 53 22 2C 31 2C 31 :26 09D9 AD 00 D0 C9 02 D0 0E A9 :AD
0821 00 2C 0B 14 00 9E 32 31 :7A 09E1 00 8D 4F 0E EE 55 0E EE :95
0829 30 30 00 00 00 00 00 00 :8B 09E9 57 0E 20 2B 12 60 A2 00 :6F
0831 00 00 00 A9 46 8D 1B 03 :40 09F1 20 FB 09 EB EB E0 0A D0 :4F
0839 A9 08 8D 19 03 A9 08 20 :39 09F9 F7 60 8D 00 D0 3B E9 01 :AD
0841 D2 FF 20 91 19 20 4E 1B :D3 0A01 9D 00 D0 90 01 60 AD 10 :CD
0849 A9 08 8D 11 D0 20 3D 0A :BD 0A09 D0 5D 33 0A 8D 10 D0 60 :24
0851 20 8B 0B A9 01 8D 96 20 :12 0A11 A2 00 20 1D 0A EB EB E0 :80
0859 A9 00 8D 67 19 8D 66 19 :A1 0A19 0A D0 F7 60 8D 00 D0 1B :4B
0861 AD 1E D0 20 2B 12 A2 00 :EA 0A21 69 01 9D 00 D0 80 01 60 :99
0869 A0 00 8B D0 FD CA D0 FA :0D 0A29 AD 10 D0 5D 33 0A 8D 10 :6F
0871 A9 00 8D 96 20 A9 1B 8D :D3 0A31 D0 60 01 01 02 02 04 04 :19
0879 11 D0 A2 04 A0 00 8B D0 :77 0A39 0B 08 10 10 AD 00 D0 29 :74
0881 FD CA D0 FA AD 77 22 F0 :02 0A41 FC 09 02 8D 00 D0 A9 02 :65
0889 1F A9 01 8D 8A 19 20 96 :0B 0A49 8D 1B D0 A9 00 8D 20 D0 :C7
0891 1D 20 8B 19 20 8B 19 20 :1B 0A51 A9 0D 8D 21 D0 A9 1F 8D :85
0899 8B 19 20 8B 19 20 8B 19 :CF 0A59 15 D0 A9 0F 8D 1C D0 A9 :A5
08A1 AD 8A 19 D0 FB 4C 3E 1F :45 0A61 01 8D 25 D0 A9 00 8D 26 :82
08A9 AD 6A 19 F0 1B A9 00 8D :19 0A69 D0 A9 05 8D 27 D0 8D 28 :8B
08B1 6A 19 20 8B 19 A9 01 8D :6E 0A71 D0 8D 29 D0 8D 2A D0 A9 :CA
08B9 8A 19 20 8B 1D 20 C0 1D :6D 0A79 00 8D 28 D0 8D 10 D0 A9 :6C
08C1 AD 8A 19 D0 FB 20 B2 1D :79 0A81 40 8D F8 43 A9 41 8D F9 :44
08C9 AD 67 19 F0 11 A9 02 8D :0F 0A89 43 A9 42 8D FA 43 A9 43 :42
08D1 8A 19 20 7A 1D 20 8A 16 :9B 0A91 8D FB 43 A9 4B 8D FC 43 :32
08D9 20 82 1D 4C FD 1D AD 4F :B5 0A99 A9 A0 8D 00 D0 8D 04 D0 :22
08E1 0E D0 97 AD 54 0E C9 02 :8E 0AA1 A9 8B 8D 06 D0 8D 02 D0 :64
08E9 F0 90 AE 57 0E 8D 8C 22 :46 0AA9 A9 AC 8D 0B D0 A9 00 8D :DE
08F1 F0 8B AD 10 D0 29 01 D0 :C4 0AB1 01 D0 8D 03 D0 A9 15 8D :05
08F9 25 AD 0B D0 C9 A8 30 1E :EC 0AB9 05 D0 8D 07 D0 A9 BE 8D :C0
0901 C9 B0 10 1A AD 01 D0 C9 :20 0AC1 09 D0 A9 0F 8D 6B 19 A2 :90
0909 AB 30 13 A9 02 8D 54 0E :01 0AC9 00 A9 00 9D 00 D0 9D FA :89
0911 20 5E 1D 20 C1 19 A9 0F :35 0AD1 D8 9D F4 D9 9D EE DA 8D :A5
0919 8D 1B D0 4C 7B 0B 4C 7B :FE 0AD9 00 44 9D 00 40 8D FA 44 :D8
0921 0B AD 4F 0E F0 0B AD 51 :CA 0AE1 9D FA 40 8D F4 45 9D F4 :72
0929 0E D0 53 4C D2 09 AD 54 :AA 0AE9 41 8D EE 46 9D EE 42 EB :3B
0931 0E F0 15 C9 01 F0 11 AE :0D 0AF1 E0 FA D0 05 AD 16 D0 09 :65
0939 57 0E 8D 8C 22 F0 01 60 :23 0AF9 10 8D 16 D0 A9 01 8D 22 :E2
0941 AD 01 D0 C9 A8 30 01 60 :F2 0B01 D0 A9 00 8D 23 D0 A2 00 :53
0949 AD 00 DC 29 04 D0 4C 20 :35 0B09 A9 09 9D 1B 41 9D 0B 42 :35
0951 EF 09 AD 10 D0 29 01 D0 :25 0B11 9D 5B 42 A9 0D 9D 1B D9 :26
0959 41 AD 00 D0 C9 00 D0 3A :A0 0B19 9D 0B DA 9D 5B DA EB E0 :F3
0961 CE 55 0E AD 55 0E C9 FF :2A 0B21 F0 D0 E5 A2 02 A0 00 B9 :79
0969 D0 07 EE 55 0E 20 11 0A :31 0B29 2F 0E 9D 1B 41 EB C8 C0 :D7
0971 60 EE 55 0E A9 01 8D 51 :99 0B31 0A D0 F4 E0 2A D0 EE A9 :82
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18D1 FD 43 A9 6A 8D FE 43 A9 :CB
18D9 68 8D FF 43 A9 FF 8D 1C :68
18E1 D0 8D 15 D0 A9 01 8D 25 :9F
18E9 D0 A9 00 8D 26 D0 A9 06 :AB
18F1 8D 27 D0 A9 02 8D 28 D0 :CF
18F9 A9 04 8D 29 D0 A9 08 8D :9A
1901 2A D0 A9 05 8D 28 D0 8D :84
1909 2C D0 8D 2D D0 8D 2E D0 :4F
1911 A9 F8 8D 10 D0 A9 7D 8D :69
1919 01 D0 A9 37 8D 03 D0 A9 :58
1921 8E 8D 05 D0 A9 6E 8D 07 :3B
1929 D0 A9 A0 8D 09 D0 8D 08 :9E
1931 D0 A9 85 8D 0D D0 8D 0F :19
1939 D0 A9 28 8D 00 D0 A9 8A :55
1941 8D 02 D0 A9 32 8D 04 D0 :C9
1949 A9 20 8D 06 D0 A9 23 8D :53
1951 08 D0 8D 0C D0 A9 38 8D :DA
1959 0A D0 8D 0E D0 A0 00 DC :DF
1961 29 10 D0 F9 60 00 00 00 :D0
1969 00 00 00 00 00 00 00 :68
1971 00 00 00 00 00 00 0A :C0
1979 08 0C 0D 0E 0F 9C 9D 9E :28
1981 9E 9F A0 04 A1 A2 A3 A4 :D2
1989 04 00 00 00 00 00 00 :8C
1991 A9 00 8D 71 19 8D 72 19 :55
1999 8D 73 19 8D 74 19 8D 75 :E7
19A1 19 8D 76 19 8D 68 19 8D :F3
19A9 6C 19 8D 6D 19 8D 6E 19 :36
19B1 8D 6F 19 8D 70 19 60 20 :00
19B9 D3 19 20 D3 19 4C 65 1A :41
19C1 20 14 1A 20 14 1A 20 14 :56
19C9 1A 20 14 1A 20 14 1A 4C :F4
19D1 65 1A EE 6E 19 AD 6E 19 :40
19D9 C9 0A F0 01 60 A9 00 8D :C7
19E1 6E 19 EE 6D 19 AD 6D 19 :4C
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19F1 6D 19 EE 6C 19 AD 6C 19 :50
19F9 C9 0A F0 01 60 A9 00 8D :E7
1A01 6C 19 EE 6B 19 AD 6B 19 :54
1A09 C9 0A F0 01 60 A9 00 8D :F7
1A11 6B 19 60 EE 6F 19 AD 6F :79
1A19 19 C9 0A F0 01 60 A9 00 :85
1A21 8D 6F 19 EE 6E 19 AD 6E :75
1A29 19 C9 0A F0 01 60 A9 00 :95
1A31 8D 6E 19 EE 6D 19 AD 6D :76
1A39 19 C9 0A F0 01 60 A9 00 :A5
1A41 8D 6D 19 EE 6C 19 AD 6C :77
1A49 19 C9 0A F0 01 60 A9 00 :85
1A51 8D 6C 19 EE 6B 19 AD 6B :78
1A59 19 C9 0A F0 01 60 A9 00 :C5
1A61 8D 6B 19 60 AD 6B 19 A2 :30
1A69 00 20 96 1A AD 6C 19 A2 :7A
1A71 02 20 96 1A AD 6D 19 A2 :8A
1A79 04 20 96 1A AD 6E 19 A2 :9A
1A81 06 20 96 1A AD 6F 19 A2 :AA
1A89 08 20 96 1A AD 70 19 A2 :BA
1A91 0A 20 96 1A 60 C9 00 D0 :1A
1A99 16 A9 48 9D 50 40 A9 4A :4B
1AA1 9D 78 40 EB A9 49 9D 50 :5B
1AA9 40 A9 48 9D 78 40 60 C9 :4F
1AB1 01 D0 16 A9 78 9D 50 40 :6D
1AB9 A9 7A 9D 78 40 EB A9 79 :23
1AC1 9D 50 40 A9 7B 9D 78 40 :BE
1AC9 60 C9 02 D0 16 A9 7C 9D :8D
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1AD9 A9 7D 9D 50 40 A9 7F 9D :29
1AE1 78 40 60 C9 03 D0 16 A9 :ED
1AE9 80 9D 50 40 A9 82 9D 78 :F6
1AF1 40 EB A9 81 9D 50 40 A9 :F8
1AF9 83 9D 78 40 60 C9 04 D0 :4F
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1B09 9D 78 40 EB A9 85 9D 50 :2B

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1829 9D 50 40 A9 88 9D 78 40 :76
1831 60 C9 06 D0 16 A9 8C 9D :84
1839 50 40 A9 8E 9D 78 40 E8 :1C
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1849 78 40 60 C9 07 D0 16 A9 :69
1851 9D 9D 50 40 A9 92 9D 78 :CE
1859 40 E8 A9 91 9D 50 40 A9 :A0
1861 93 9D 78 40 60 C9 08 D0 :E3
1869 16 A9 94 9D 50 40 A9 96 :5F
1871 9D 78 40 E8 A9 95 9D 50 :F3
1879 40 A9 97 9D 78 40 60 A9 :03
1881 98 9D 50 40 A9 9A 9D 78 :36
1889 40 E8 A9 99 9D 50 40 A9 :F0
1891 98 9D 78 40 60 AD 8B 19 :50
1899 F0 18 CE 8B 19 AD 8B 19 :6E
19A1 F0 03 4C 04 1C A9 00 8D :74
19A9 04 D4 A9 00 8D 8A 19 4C :58
19B1 2C 1C AD 8A 19 D0 03 4C :15
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19C1 8D 01 D4 A9 6B 8D 05 D4 :8B
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19D9 8B 19 4C 2C 1C C9 02 D0 :F9
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1C29 4C 2C 1C AD 8D 19 F0 18 :7B
1C31 CE 8D 19 AD 8D 19 F0 03 :16
1C39 4C 72 1C A9 00 8D 0B D4 :9B
1C41 A9 00 8D 8C 19 4C 78 1C :2D
1C49 AD 8C 19 D0 03 4C 78 1C :97
1C51 A9 0A 8D 0B D4 A9 0B 8D :8E
1C59 0C D4 A9 00 8D 0D D4 A9 :2A
1C61 8F 8D 07 D4 A9 21 8D 0B :B4
1C69 D4 A9 1E 8D 8D 19 4C 78 :47
1C71 1C CE 07 D4 4C 78 1C AD :05
1C79 8F 19 F0 16 CE 8F 19 AD :DB
1C81 8F 19 F0 03 4C 87 1C A9 :EF
1C89 00 8D 12 D4 A9 00 8D 8E :C0
1C91 19 60 AD 8E 19 D0 01 60 :0C
1C99 A9 10 8D 0F D4 A9 0B 8D :FE
1CA1 13 D4 A9 00 8D 14 D4 A9 :A3
1CA9 8F 8D 0E D4 A9 21 8D 12 :49
1CB1 D4 A9 1E 8D 8F 19 CE 0E :D7
1CB9 D4 60 20 C8 1C 78 4C 46 :70
1CC1 0B 20 C9 1C 78 4C 49 0B :32
1CC9 AD 6B 19 CD 71 19 F0 03 :3D
1CD1 10 36 60 AD 6C 19 CD 72 :FD
1CD9 19 F0 03 10 2B 60 AD 6D :54
1CE1 19 CD 73 19 F0 03 10 20 :82
1CE9 60 AD 6E 19 CD 74 19 F0 :3B
1CF1 03 10 15 60 AD 6F 19 CD :E4
1CF9 75 19 F0 03 10 0A 60 AD :0F
1D01 70 19 CD 76 19 10 01 60 :C5
1D09 AD 6B 19 8D 71 19 AD 6C :F0
1D11 19 8D 72 19 AD 6D 19 8D :03
1D19 73 19 AD 6E 19 8D 74 19 :3B
1D21 AD 6F 19 8D 75 19 AD 70 :44
1D29 19 8D 76 19 AD 71 19 A2 :E7
1D31 1C 20 96 1A AD 72 19 A2 :82
1D39 1E 20 96 1A AD 73 19 A2 :92
1D41 20 20 96 1A AD 74 19 A2 :A2
1D49 22 20 96 1A AD 75 19 A2 :B2
1D51 24 20 96 1A AD 76 19 A2 :C2
1D59 26 20 96 1A 60 A2 00 8D :7C
1D61 97 20 9D 70 43 E8 E0 50 :2D
1D69 D0 F5 60 A2 00 8D E7 20 :89
1D71 9D 70 43 E8 E0 50 D0 F5 :EE
1D79 60 A2 00 8D 37 21 9D 70 :84
1D81 43 E8 E0 50 D0 F5 60 A2 :F1
1D89 00 8D 87 21 9D 70 43 E8 :E1
1D91 E0 50 D0 F5 60 A2 00 8D :E8
1D99 D7 21 9D 70 43 E8 E0 50 :A7
1DA1 D0 F5 60 A2 00 8D 27 22 :91

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1DC9 43 8D E5 1D 8D 8B 43 8D :6B
1DD1 ED 1D 8D 82 43 8D F5 1D :8E
1DD9 8D 83 43 60 78 7C 8D 84 :F4
1DE1 8B 8C 90 94 79 7D 81 85 :7A
1DE9 89 8D 91 95 7A 7E 82 86 :A6
1DF1 8A 8E 92 96 78 7F 83 87 :D2
1DF9 8B 8F 93 97 A9 52 8D F8 :8A
1E01 43 A9 56 8D F9 43 A9 53 :71
1E09 8D FA 43 A9 55 8D FE 43 :F7
1E11 8D FD 43 A9 57 8D F8 43 :FA
1E19 A9 54 8D FC 43 A9 58 8D :15
1E21 FF 43 A9 01 8D 27 D0 8D :67
1E29 2B D0 8D 29 D0 8D 2A D0 :3F
1E31 8D 2B D0 8D 2C D0 8D 2D :86
1E39 D0 8D 2E D0 8D 00 8D 1C :F4
1E41 D0 A9 FF 8D 10 D0 8D 15 :46
1E49 D0 A9 74 8D 01 D0 8D 05 :E2
1E51 D0 8D 09 D0 8D 0D 8D 0A :9C
1E59 A0 8D 03 D0 8D 07 D0 8D :5E
1E61 0B D0 8D 0F D0 8D 50 8D :8C
1E69 00 D0 A9 69 8D 02 D0 A9 :6C
1E71 82 8D 04 D0 A9 9B 8D 06 :52
1E79 D0 A9 84 8D 0B D0 A9 CD :F9
1E81 8D 0A D0 A9 E6 8D 0C D0 :D5
1E89 A9 FF 8D 0E D0 A9 01 8D :83
1E91 64 13 A9 01 8D 90 19 AD :51
1E99 00 DC 29 10 F0 17 AD 10 :80
1EA1 D0 29 8D D0 F2 AD 0E D0 :2C
1EA9 D0 ED A9 00 8D 15 D0 8D :A4
1EB1 90 19 4C 8B 1C A9 00 8D :2C
1EB9 15 D0 8D 90 19 4C C2 1C :C7
1EC1 A2 00 A0 00 20 20 1F E8 :8B
1EC9 C8 C8 E0 0B D0 F6 AD 64 :8F
1ED1 13 D0 26 CE 01 D0 CE 05 :DC
1ED9 D0 CE 09 D0 CE 0D 0E EE :13
1EE1 03 D0 EE 07 D0 EE 0B D0 :DA
1EE9 EE 0F D0 AD 01 D0 C9 74 :1C
1EF1 F0 01 60 A9 01 8D 64 13 :4D
1EF9 60 EE 01 D0 EE 05 D0 EE :5B
1F01 09 D0 EE 0D D0 CE 03 D0 :20
1F09 CE 07 D0 CE 0B D0 CE 0F :8D
1F11 D0 AD 03 D0 C9 74 F0 01 :C0
1F19 60 A9 00 8D 64 13 60 89 :CC
1F21 00 D0 3B E9 01 99 00 D0 :27
1F29 90 01 60 AD 10 D0 5D 36 :F9

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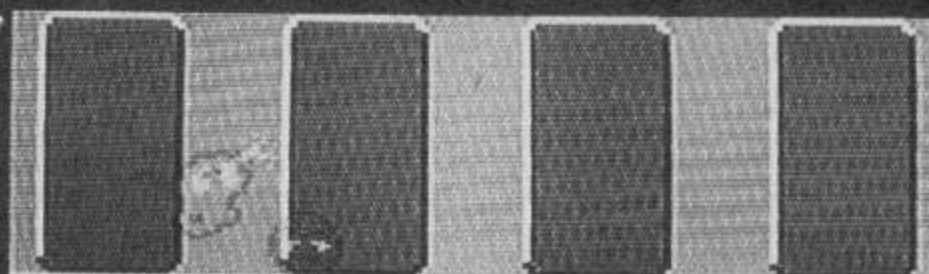
1F31 1F 8D 10 D0 60 01 02 04 :ED
1F39 0B 10 20 40 80 20 A4 1D :64
1F41 A2 00 A9 4B 9D F8 43 A9 :07
1F49 05 9D 27 D0 E8 E0 0B D0 :BC
1F51 F1 A9 3B 8D 00 D0 A9 5B :AE
1F59 8D 02 D0 A9 7B 8D 04 D0 :3F
1F61 A9 9B 8D 06 D0 A9 8B 8D :6E
1F69 0B D0 A9 DB 8D 0A D0 A9 :60
1F71 F8 8D 0C D0 A9 1B 8D 0E :0E
1F79 D0 A9 8B 8D 10 D0 A9 FF :15
1F81 8D 1C D0 8D 15 D0 A9 A0 :D1
1F89 8D 01 D0 8D 05 D0 8D 09 :D7
1F91 D0 8D 0D D0 A9 AA 8D 03 :1D
1F99 D0 8D 07 D0 8D 0B D0 8D :F2
1FA1 0F D0 A9 01 8D 7B 22 A9 :15
1FAB 01 8D 7A 22 A9 0B 8D 79 :D9
1FB1 22 A2 00 A0 00 8B D0 FD :5E
1FB9 CA D0 FA CE 79 22 AD 79 :F4
1FC1 22 D0 F2 A9 00 8D 7A 22 :80
1FC9 7B AD 11 D0 29 EF 8D 7B :0F
1FD1 C5 20 3D 0A EE E3 10 AD :84
1FD9 E3 10 C9 01 D0 16 A2 00 :3C
1FE1 8D 63 10 9D 7B 22 8D E4 :85
1FE9 10 9D 8C 22 E8 E0 40 D0 :F6
1FF1 EF 4C 27 D0 C9 02 D0 16 :C5
1FF9 A2 00 8D A3 10 9D 7B 22 :CB
2001 8D 24 11 9D 8C 22 E8 E0 :7C
2009 40 D0 EF 4C 27 20 A9 00 :07
2011 8D E3 10 A2 00 8D 23 10 :FE
2019 9D 7B 22 8D E3 0F 9D 8C :F9
2021 22 E8 E0 40 D0 EF A9 00 :FB
2029 8D 69 19 8D 6A 19 8D 77 :41
2031 22 8D 90 19 8D 67 19 20 :5A
2039 64 11 20 2D 1D 20 65 1A :86
2041 20 5C 0C 4C 54 0B AD 7B :8B
2049 22 D0 25 CE 01 D0 CE 05 :60
2051 D0 CE 09 D0 CE 0D D0 EE :8B
2059 03 D0 EE 07 D0 EE 0B D0 :52
2061 EE 0F D0 AD 01 D0 C9 A0 :F4
2069 D0 05 A9 01 8D 7B 22 60 :C0
2071 EE 01 D0 EE 05 D0 EE 09 :4B
2079 D0 EE 0D D0 CE 03 D0 CE :C3
2081 07 D0 CE 0B D0 CE 0F D0 :8A
2089 AD 03 D0 C9 A0 D0 E0 A9 :37
2091 00 8D 7B 22 60 00 04 04 :86
2099 04 04 04 04 04 04 04 :2B
20A1 04 04 6B 69 2C 2D 20 21 :5A
20AB 20 21 20 21 04 04 04 04 :56
20B1 04 04 04 04 04 04 04 :40

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SCORE
000300

HIGH
000300

POPPER



BYSEANTPOTTS



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2089 04 04 04 04 04 04 04 04 :4B
20C1 04 04 04 04 04 04 04 04 :50
20C9 04 04 6A 6B 2E 2F 22 23 :C4
20D1 22 23 22 23 A5 A6 A5 A6 :FA
20D9 A5 A6 04 04 04 04 04 04 :4D
20E1 04 04 04 04 04 04 04 04 :70
20E9 04 04 04 04 04 04 04 04 :78
20F1 04 04 04 04 14 15 4B 49 :3A
20F9 30 31 44 45 2B 29 A7 A8 :F9
2101 04 04 04 04 04 04 04 04 :90
2109 04 04 04 04 04 04 04 04 :9B
2111 04 04 04 04 04 04 04 04 :A0
2119 04 04 04 04 16 17 4A 4B :96
2121 32 33 46 47 2A 2B A5 A6 :2D
2129 04 04 04 04 04 04 04 04 :B8
2131 04 04 04 04 04 04 04 04 :C0
2139 04 04 04 04 04 04 04 04 :C8
2141 04 04 5B 59 4C 4D 3C 3D :8E
2149 10 11 5C 5D 5C 5D A7 A8 :CD
2151 A7 A8 04 04 04 04 04 04 :CB
2159 04 04 04 04 04 04 04 04 :EB
2161 04 04 04 04 04 04 04 04 :F0
2169 04 04 5A 5B 4E 4F 3E 3F :F8
2171 12 13 5E 5F 5E 5F A5 A6 :01
2179 A5 A6 04 04 04 04 04 04 :ED
2181 04 04 04 04 04 04 04 04 :10
2189 04 04 04 04 04 04 04 04 :18
2191 04 04 4C 4D 20 21 10 11 :12
2199 5B 59 04 04 A5 A6 04 04 :17
21A1 4B 49 04 04 04 04 04 04 :FE
21A9 04 04 04 04 04 04 04 04 :3B
21B1 04 04 04 04 04 04 04 04 :40
21B9 04 04 4E 4F 22 23 12 13 :7C
21C1 5A 5B 04 04 A5 A6 04 04 :45
21C9 4A 4B 04 04 04 04 04 04 :2C
21D1 04 04 04 04 04 04 04 04 :60
21D9 04 04 04 04 04 04 04 04 :6B
21E1 6B 69 20 21 3C 3D 3C 3D :24
21E9 04 04 1C 1D 4B 49 44 45 :DE
21F1 20 21 A7 A8 04 04 04 04 :4F
21F9 04 04 04 04 04 04 04 04 :8B
2201 04 04 04 04 04 04 04 04 :90
2209 6A 6B 22 23 3E 3F 3E 3F :94
2211 04 04 1E 1F 4A 4B 46 47 :4B
2219 22 23 A5 A6 04 04 04 04 :6F
2221 04 04 04 04 04 04 04 04 :B0
2229 04 04 04 04 04 04 04 04 :B8
2231 4B 49 60 61 54 55 04 04 :8C
2239 2C 2D 20 21 54 55 4B 49 :84
2241 A7 A8 A7 A8 04 04 04 04 :34
2249 04 04 04 04 04 04 04 04 :DB
2251 04 04 04 04 04 04 04 04 :E0
2259 4A 4B 62 63 56 57 04 04 :DE
2261 2E 2F 22 23 56 57 4A 4B :F4
2269 A5 A6 A5 A6 04 04 04 04 :4B
2271 04 04 04 04 04 04 00 00 :C4
2279 00 00 00 FF 00 FF 00 00 :6E

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PROGRAM: POP GRAPHICS
USE HEX DATA ENTRY TO ENTER THIS PROGRAM.

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4400 04 5B 59 1B 19 4B 49 54 :EB
440B 55 20 21 04 04 04 04 04 :7B
4410 04 04 04 04 04 04 04 04 :A0
441B 04 04 04 04 04 04 2C 2D :0B
4420 30 31 2B 29 2C 2D 04 04 :F4
442B 04 5A 5B 1A 1B 4A 4B 56 :59
4430 57 22 23 04 04 04 04 04 :AC
443B 04 04 04 04 04 04 04 04 :C8
4440 04 04 04 04 04 04 2E 2F :4E
444B 32 33 2A 2B 2E 2F 04 04 :46
4450 4B 49 4B 49 4B 49 4B 49 :B4
445B 4B 49 4B 49 04 04 04 04 :96
4460 04 04 04 04 04 04 04 04 :F0
446B 04 04 04 04 4B 49 4B 49 :EE
4470 4B 49 4B 49 4B 49 4B 49 :A4
447B 4A 4B 4A 4B 4A 4B 4A 4B :F4
4480 4A 4B 4A 4B 04 04 04 04 :D2
448B 04 04 04 04 04 04 04 04 :1B
4490 04 04 04 04 04 4A 4B 4A :4A
449B 4A 4B 4A 4B 4A 4B 4A 4B :14
44A0 04 04 04 04 04 04 04 04 :30
44AB 04 04 04 04 04 04 4C 4D :7B
44B0 4B 49 4C 4D 4C 4D 20 21 :D4
44BB 54 55 04 04 04 04 04 04 :3A
44C0 04 04 04 04 04 04 04 04 :50
44CB 04 04 04 04 04 04 04 04 :5B
44D0 04 04 04 04 04 04 4E 4F :8E
44DB 4A 4B 4E 4F 4E 4F 22 23 :44
44E0 56 57 04 04 04 04 04 04 :6B
44EB 04 04 04 04 04 04 04 04 :7B
44F0 04 04 04 04 04 04 04 04 :80
44FB 04 04 04 04 04 04 04 04 :8B
4500 04 04 04 04 04 04 04 04 :90
450B 04 04 04 04 04 04 04 04 :9B
4510 04 04 04 04 04 04 04 04 :A0
451B 04 04 04 04 04 04 04 04 :AB
4520 04 04 04 04 04 04 04 04 :B0
452B 04 04 04 04 04 04 04 04 :B8
4530 04 04 04 04 04 04 04 04 :C0
453B 04 04 04 04 04 04 04 04 :CB
4540 04 04 04 04 04 04 04 04 :D0
454B 04 04 04 5C 5D 2C 2D 20 :E4
4550 21 04 04 1B 19 54 55 10 :2D
455B 11 74 75 70 71 04 04 04 :F9
4560 04 04 04 04 04 04 04 04 :F0
456B 04 04 04 04 04 04 04 04 :F8
4570 04 04 04 5E 5F 2E 2F 22 :4B
457B 23 04 04 1A 1B 56 57 12 :93
4580 13 76 77 72 73 04 04 04 :3F
458B 04 04 04 04 04 04 04 04 :1B
4590 04 04 04 04 04 04 04 04 :20
459B 04 04 04 04 04 04 04 04 :2B
45A0 04 04 04 04 04 04 04 04 :30
45AB 04 04 04 04 04 04 04 04 :3B
45B0 04 04 04 04 04 04 04 04 :40
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45C0 04 4C 4D 20 21 10 11 04 :5F
45CB 04 4C 4D 4B 49 4C 4D 4C :1B
45D0 4D 30 31 44 45 2B 29 04 :AB
45DB 04 04 04 04 04 04 04 04 :B8
45E0 04 04 04 04 04 04 04 04 :70
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45FB 4F 32 33 46 47 2A 2B 04 :0B
4600 04 04 04 04 04 04 04 04 :90
460B 04 04 04 04 04 04 04 04 :9B
4610 04 04 04 04 04 04 04 04 :A0
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4620 04 04 04 04 04 04 04 04 :B0
462B 04 04 04 04 04 04 04 04 :B8
4630 04 04 04 04 04 04 04 04 :C0
463B 04 04 04 2B 29 10 11 40 :94
4640 41 20 21 04 04 24 25 54 :C3
464B 55 4B 49 40 41 04 04 04 :A1
4650 04 04 04 04 04 04 04 04 :E0
465B 04 04 04 04 04 04 04 04 :EB
4660 04 04 04 2A 2B 12 13 42 :F8
466B 43 22 23 04 04 26 27 56 :21
4670 57 4A 4B 42 43 04 04 04 :E7
467B 04 04 04 04 04 04 04 04 :0B
4680 04 04 04 04 04 04 04 04 :10
468B 04 04 04 04 04 04 04 04 :1B
4690 04 04 04 04 04 04 04 04 :20
469B 04 04 04 04 04 04 04 04 :2B
46A0 04 04 04 04 04 04 04 04 :30
46AB 04 04 04 04 04 04 04 04 :3B
46B0 04 04 04 04 04 04 04 04 :40
46BB 04 04 04 04 04 04 04 04 :4B
46C0 04 04 04 04 04 04 04 04 :50
46CB 04 04 04 04 04 04 04 04 :5B
46D0 04 04 04 04 04 04 04 04 :60
46DB 04 04 04 04 1B 19 4B 49 :4E
46E0 4B 49 3C 3D 5B 59 4B 49 :70
46EB 24 25 5C 5D 04 04 04 04 :46
46F0 04 04 04 04 04 04 04 04 :80
46FB 04 04 04 04 04 04 04 04 :8B
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470B 4A 4B 3E 3F 5A 5B 4A 4B :E0
4710 26 27 5E 5F 04 04 04 04 :B2
471B 04 04 04 04 04 04 04 04 :AB
4720 04 04 04 04 04 04 04 04 :B0
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4730 04 04 04 04 04 04 04 04 :C0
473B 04 04 04 04 04 04 04 04 :CB
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4760 04 04 04 04 04 04 04 04 :F0
476B 04 04 04 04 04 04 04 04 :F8
4770 04 04 04 04 04 04 04 04 :00
477B 14 15 70 71 04 04 30 31 :CE
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478B 4B 49 5C 5D 5C 5D 5B 59 :14
4790 04 04 04 04 04 04 04 04 :20
479B 04 04 04 04 04 04 04 04 :2B
47A0 16 17 72 73 04 04 32 33 :2B
47AB 12 13 46 47 04 04 4E 4F :94
47B0 4A 4B 5E 5F 5E 5F 5A 5B :B4
47BB 04 04 04 04 04 04 04 04 :4B
47C0 04 04 04 04 04 04 04 04 :50
47CB 04 04 04 04 04 04 04 04 :5B
47D0 04 04 04 04 04 04 04 04 :60
47DB 04 04 04 04 04 04 04 04 :6B
47E0 04 04 04 04 04 04 04 04 :70
47EB FF 00 00 00 00 00 00 00 :E7
47F0 00 00 00 00 00 00 00 00 :F0
47FB 00 00 00 00 00 00 00 00 :F8
4800 05 15 1F 5F 7F 7F 7F 7F :EE
480B 55 55 FF FF FF FF FF FF :E6
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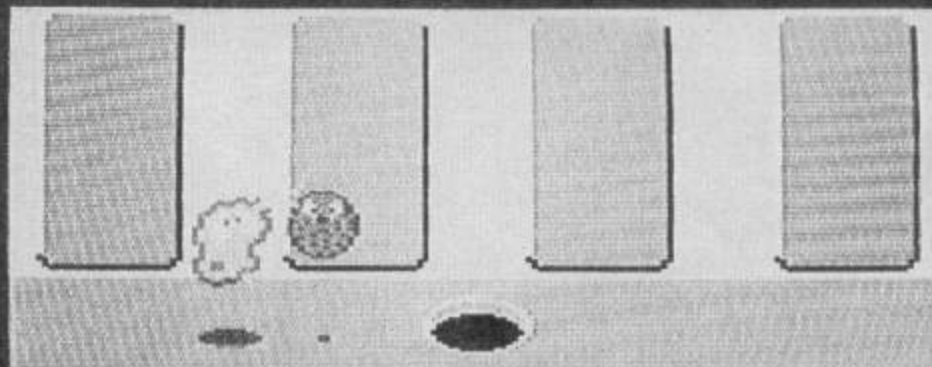
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BYSEANTPOTTS



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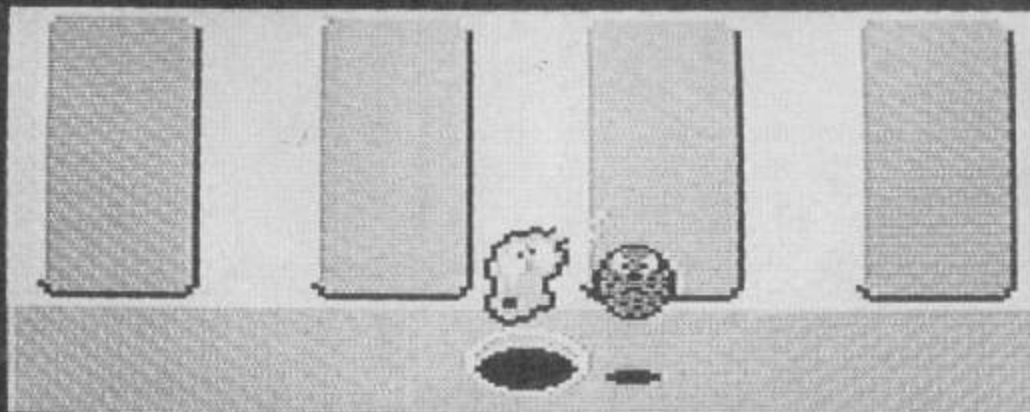
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5688 BC AA AA AC AA AA AC 00 :78 5858 00 00 3A 00 00 FA 00 03 :FA 59F8 C0 00 EB 00 00 3C 00 00 :E1
56C0 3A AA AA 3A AA AA 3A AA :68 5860 E9 00 03 A5 00 03 A7 00 :89 5A00 00 00 0F 00 00 FF 00 03 :3F
56C8 AA 3A AA AB 3E AA AB 0E :0F 5868 03 97 00 0F 95 00 0E 95 :C8 5A08 FA 00 0F AA 00 3E AA 00 :F1
56D0 AA AB 0E AA AA 0F AA AA :44 5870 00 0E 95 00 0E 95 00 0E :7F 5A10 3A AA 00 FA AA 00 EA AA :8E
56D8 03 AA AA 03 AA AA 03 EA :EC 5878 A6 00 0F AA 00 03 AA 00 :AB 5A18 03 EA 6A 03 A9 5A 03 A9 :FF
56E0 AA 00 EA AA 00 EA AA 00 :12 5880 00 01 00 00 00 01 00 10 :08 5A20 5A 0F A9 56 0E A9 56 0E :F1
56E8 FA AA 00 3A AA 00 3A AA :56 5888 40 00 01 04 00 01 00 3C :C1 5A28 A9 76 0E AA 76 0E AA 56 :87
56F0 00 3A AA 00 3E AA 00 0F :0C 5890 C5 00 FF 05 50 EB A0 44 :38 5A30 3E AA 9A 3A AA AA 3A AA :AC
56F8 EB 00 03 FF 00 00 3C 00 :8C 5898 AA AC 00 A6 8C 00 95 80 :71 5A38 AA 3A AA AA 3A AA AA 00 :C0
5700 AA AA AC AA AA AC AA AA :FA 58A0 10 B5 8C 00 B5 AC 00 95 :87 5A40 F0 00 00 FF 00 00 AF C0 :F5
5708 AC EA AA AC EA AA BC EA :38 58A8 6C 00 A5 6C 00 A5 BC 00 :85 5A48 00 AA F0 00 AA BC 00 AA :76
5710 AA B0 AA AA B0 AA AA F0 :52 58B0 A9 B0 00 AA B0 00 AA F0 :F7 5A50 AC 00 AA AF 00 AA AB 00 :5F
5718 AA AB C0 AA AB 00 AA AB :55 58B8 00 AB C0 00 AB 00 00 00 :A5 5A58 A9 AB C0 A5 6A C0 A5 6A :90
5720 00 AA AB 00 AA AF 00 AA :31 58C0 00 03 AA 00 03 AA 00 03 :E7 5A60 C0 95 6A F0 95 6A B0 9D :65
5728 AC 00 AA BC 00 AA B0 00 :8E 58C8 AA 00 0F AA 00 0E BE 00 :CD 5A68 6A B0 9D AA B0 95 AA B0 :C5
5730 AB F0 00 BF C0 00 FC 00 :58 58D0 0E BE 00 0E BE 00 0F AA :01 5A70 A6 AA BC AA AA AC AA AA :96
5738 00 C0 00 00 00 00 00 00 :B8 58D8 00 03 AA 00 03 EB 00 00 :6D 5A78 AC AA AA AC AA AA AC 00 :28
5740 00 00 00 00 00 0F 00 00 :9A 58E0 FF 00 00 3C 00 00 00 00 :CF 5A80 3A AA AA 3A AA AA 3A AA :28
5748 3F 00 00 FA 00 03 EA 00 :E7 58E8 00 00 00 00 00 00 00 :E8 5A88 AA 3A AA BA 3E AA BF 0E :67
5750 03 AA 00 0F AA 00 0E AA :E7 58F0 00 00 00 00 00 00 00 :F0 5A90 AA AF 0E AA AA 0E AA AA :06
5758 00 3E AA 00 3A A6 00 3A :A8 58F8 00 00 00 00 00 00 00 :F8 5A98 0E AA AA 0F AA AA 03 AA :E7
5760 95 00 3A 95 00 FA B5 00 :C6 5900 AB 00 00 AB 00 00 AB C0 :04 5AA0 AA 03 AA AA 03 EA AA 00 :27
5768 EA 75 00 EA 55 00 EA 55 :98 5908 00 AA C0 00 AA C0 00 AA :8E 5AAB EA AA 00 FA AA 00 3A AA :06
5770 03 EA 95 03 AA 96 03 AA :4D 5910 C0 00 AF C0 00 BF 00 00 :57 5AB0 00 3E AA AA 00 0F AA 00 03 :89
5778 AA 0F AA AA 0E AA AA 00 :CE 5918 B0 00 00 F0 00 00 C0 00 :C8 5AB8 FA 00 00 FF 00 00 0F 00 :17
5780 00 00 00 F0 00 00 FF 00 :39 5920 00 00 00 00 00 00 00 :20 5AC0 AA AA AC AA AA AC AA AA :8A
5788 04 AF C0 00 AA C0 40 AA :0C 5928 00 00 00 00 00 00 00 :28 5AC8 AC AE AA AC FE AA BC FA :64
5790 F3 05 AA BF 10 AA AE 54 :35 5930 00 00 00 00 00 00 00 :30 5AD0 AA B0 AA AA B0 AA AA B0 :12
5798 A6 AA B4 95 AA B1 97 AA :58 5938 00 00 00 00 00 00 00 :38 5AD8 AA AA B0 AA AA F0 AA AA :76
57A0 F0 97 6A C0 95 6A C0 95 :49 5940 00 FF 00 03 AA C0 0E AA :CE 5AE0 C0 AA AA C0 AA AB C0 AA :06
57A8 6A C0 95 6A C0 A5 AA C0 :3D 5948 B0 0E AA B0 3A AA AC 3A :74 5AEB AB 00 AA AF 00 AA AC 00 :FD
57B0 A9 AB C0 AA AB 00 AA AB :EC 5950 AA AC 3B EB EC FD 7D 7F :9C 5AF0 AA BC 00 AA F0 00 AF C0 :33
57B8 00 AA AB 00 AA AF 00 00 :79 5958 F5 EB 5F FD 7D 7F EF EB :80 5AF8 00 FF 00 00 F0 00 00 00 :A6
57C0 0E AA AA 0E AA AA 0F AA :5F 5960 FB EA AA AB EA AA AB EA :64 5B00 00 00 F0 00 00 F0 00 00 :70
57C8 AA 03 AA AA 03 AA AF 03 :0A 5968 EB AB 3A BE AC 3A AA AC :0D 5B08 F0 00 00 F0 00 03 AC 00 :7E
57D0 AA AF 03 EA AF 00 EA AA :AA 5970 3A BE AC 0E AA B0 0E AA :86 5B10 03 AC 00 03 AC 00 03 AC :48
57D8 00 FA AA 00 3A AA 00 FA :B8 5978 B0 03 AA C0 00 FF 00 00 :26 5B18 00 03 AB 00 03 AB 00 03 :48
57E0 AA 00 EA AA 00 EA AA 00 :12 5980 00 FF 00 03 FF C0 03 FF :12 5B20 9B 00 0E 9B 00 0E 9B 00 :E2
57E8 FA AA 00 3A AB 00 3A AF :83 5988 C0 03 FF C0 3F FF FC 3F :5C 5B28 0E 9B 00 0E 9B 00 0E 9B :E5
57F0 00 3A AC 00 3E BC 00 0F :7E 5990 FF FC 03 EB C0 0D 7D 70 :35 5B30 00 0E 6B 00 0E 6B 00 3A :25
57F8 F0 00 03 C0 00 00 00 00 :F1 5998 0D EB 70 3D EB 7C 3F FF :EF 5B38 6B 00 3A 6B 00 3A 6C 00 :4D
5800 AA AC 00 AA AF 00 AA AB :13 59A0 FC 3A BE AC 3A AA AC 3A :9C 5B40 00 3A 6C 00 39 AC 00 39 :E5
5808 00 AA AB C0 AA AA C0 AA :38 59A8 EB AC 3A BE AC 3A AA AC :4F 5B48 AC 00 39 AC 00 39 AC 00 :59
5810 AA C0 AA AA C0 AA AA C0 :42 59B0 0E BE B0 0E AA B0 0E AA :A6 5B50 E9 AC 00 E9 B0 00 E6 B0 :6F
5818 AA AB C0 AA AB 00 AA AF :75 59B8 B0 03 AA C0 00 FF 00 00 :66 5B58 00 E6 B0 03 A6 B0 03 9A :83
5820 00 AA AC 00 AA AC 00 AA :22 59C0 00 FF 00 0F AA F0 3A AA :02 5B60 C0 03 9A C0 0E 9A C0 0E :86
5828 BC 00 EA B0 00 FE B0 00 :26 59C8 AC EA AA AB EA AA AB 39 :F5 5B68 6B 00 3A 6B 00 39 AC 00 :37
5830 3F F0 00 03 C0 00 00 00 :18 59D0 AA 6C 39 69 6C 0D 55 70 :DE 5B70 EA AC 00 EA B0 00 EA C0 :30
5838 00 00 00 00 00 00 00 :38 59D8 0D 07 70 3A 55 AC EA 96 :92 5B78 00 3F 00 00 00 00 00 :F6
5840 00 00 00 00 00 00 00 :40 59E0 AB EA BE AB EA BE AB EE :68 5B80 00 00 D0 BD 15 D0 A9 A0 :0C
5848 00 00 00 00 00 00 00 :48 59E8 AA BB EB FF EB 3A AA AC :BE

```

SCORE
000000

HIGH
000300

POPPER



SPLATT!!

Contributions

*So you own a Commodore? So you've
written some programs? So why haven't you
sent them to us?*

Your Commodore is always on the look out for new programs, hints and tips, articles and even regular series. In fact if you have something that you think could be of use to other Commodore owners we want to hear about it.

So if you have got something which you think we may be interested in. How do you go about submitting it to us?

Below you will find a list of guidelines that will help us to deal with any item that you send in to us. We don't expect everybody to be the next William Shakespeare but if you do follow these simple rules then it will make our job a lot easier.

1) If possible all material sent to the magazine should be typed or printed out on a computer printer.

2) All text should be double spaced i.e. there should be a blank line between each line of text. You should also leave a margin of about 10 characters around the text.

3) On the very first page you should put the following:

Name of the article
Machine that it is for
Any extras required - disk, printer etc.
Your name
Your address
Your telephone number

4) The top of every page should have the following information on it:

Abbreviation of the article title
Your name
The page number

For example, suppose you had submitted an article on C64 interrupts. You should put something like the following at the head of the page:

Interrupts/J.Smith/1

5) Please make sure that you do not make any additional marks on your text especially underlining.

6) Try and write in clear concise English, it does not have to be a work of literature but it must be comprehensible.

7) On the bottom of each page you should put the word MORE if there are more pages to the article or ENDS if it is the last page.

8) If possible, enclose a listing of all programs.

9) Under no circumstances use a staple to hold the pages together. Use a paperclip instead.

10) Programs should be included on either disk or tape. Make sure that you SAVE two copies of every program so that we have a better chance of loading them if problems occur.

11) Programs under 10 lines can be included in the text. If your program is longer than this you must enclose a disk or cassette.

12) If your article needs any artwork then supply clear examples of what is needed. We don't expect you to be an artist but we do need to see what is required.

13) Photographs, if necessary, must be either black and white prints or colour slides. We can take shots ourselves so don't worry about this too much.

14) Submissions of any length are welcome. If you have a five line routine that you think may be of use to someone else we welcome it just as much as a full blown six part series.

15) Payment varies quite a lot and depends on quite a number of factors, such as complexity of program, presentation of program, number of magazine pages it takes up etc. Payment is generally between £10.00 and £800.00.

16) All payments are made in the month that the magazine containing your article has appeared in print.

17) If we do find your submission suitable for inclusion in the magazine we will write to you giving the terms of publication, the rate of payment and an agreement form. Prompt return of this form will allow us to use your program as soon as possible.

18) If you want the program returning to you, should we find it unsuitable for publication, then you should enclose a stamped self addressed envelope.

19) The last and most important point to make is 'get writing', we are waiting for your articles.

Pirate Power

If you're a Basic programmer looking for new tools then this Basic Extension from Pirate Software may be just what you're after.

By Evelyn Mills

Extension 64 is a program which will extend your Basic into a form which is both compact and efficient. Naturally you will require to restructure your ideas on programming, but commands have been streamlined to an extent which is quite remarkable. To select a random example from the 120 or so extra commands available, 'STIX 2,2' will give a joystick response on both the x and y axes.

On loading you will find that you have 30 plus K available for programming, the whole being entirely compatible with standard Basic if you so wish. Effectively, *Extension 64* is primarily intended to enable you to manipulate sprites and music with greater ease and this it most certainly does. There are, of course, many other inbuilt features but these are the two which should impress you most.

You may be daunted by the Manual, however demos are available on both cassette and disk and, if you follow the MAZE Demonstrating through in the supplementary listing provided, you should get to grips with this incredibly simple program structure. Plenty of examples are provided in the Manual and the cross-references are good.

Sprites

So what does all this do? SPRITES may be animated with a one line command, while boundary limits can be set to bounce your sprites around in a variable fashion. Up to 64 sprites

may be displayed on the screen at any one time, working on a basis of seven sets and eight sprites. I would recommend that one set is sufficient for starters. Sprites may be rotated, flipped around, made to 'chase' each other (FLEE command!) or halted (HALTON).

In the event that you do not have a sprite generator, there is an excellent one provided which operates via keyboard or joystick. The SPREGEN (generator) has a very good screen display, allows for flipping, multi-colour display and saves the data to tape or disk for recall if required. Data files may be created in this way. All of the functions and displays are well documented in the Manual: please take note of how to reload your sprite data!

Music

Now to MUSIC. In the demo section you will find a program called ROUND. The tone and quality of the music is excellent; let this demo run on until the music has finished and you will find a 'keyboard' with three Boogie Rhythms incorporated which can give you a lot of fun - full screen directions here.

To program music however, back to the manual: the main references to head for here are VOICE and PLAY; these sections contain full data on how to control waveform, modulation, frequency, synchronisation etc. To find out how to program such data and to output a one or three voice melody, again refer to the demo programs. You

will be surprised at the simplicity of operation.

Other Features

Now to the CHRGEN or character generator. This is a fairly standard procedure for redefinition of characters (nice and compact) and a full set of redefined characters may be saved and reloaded for further programming.

Hires graphics are not forgotten; line drawing, circling and boxing are all present, with a choice of modes, colour, and pens. There are full instructions for a SPLIT SCREEN mode allowing multicolour bit map graphics and text to be used together.

I did say that there are over 120 commands - look up the Quick Reference Index and you will find them there - Print at, Color at, Shrinking, Scrolling, Restore to a line number (very useful), Screen blanking, Auto-numbering, Block deletion etc. Some things old and a lot new.

The most impressive feature of EX-64 is its compactness of commands: use it in conjunction with Basic and you have here a very powerful programming tool indeed to give you maximum effect with minimal effort. Remember that this a programmer's program.

Touchline

Program: *Extension 64*, **Company:** *Pirate Software, 24 Badger Lane, Ingleby Barwick, Stockton-On-Tees, Cleveland. Tel: 0642 762540. Price:* £7.95 tape, £9.40 disk, £17.95 cartridge.

Bare Facts

Inside the Commodore range of computers there are a variety of machine code routines that are available to the user. We look at what they are and how to use them.

Whenever any action is taken on a Commodore computer an internal machine code routine actually handles the action. For example there is a routine in the computers that prints out the character in the A register to the current output device.

All of these routines sit in a Read Only Memory (ROM) inside the computer called the Kernal. These routines are therefore referred to as Kernal Routines.

Commodore, in infinite wisdom, has placed the routines on each of their computers in the same area of memory, obviously not all machines have the same routines, but where they are the same they sit at the same place. Knowing what these routines do and where they sit in the computer's memory is extremely important when writing machine code programs or transferring a program from one machine to another.

Below you will find a complete list of all the major Kernal routines. This should aid you in writing your own machine code programs and converting from one machine to another.

ACPTR

Purpose: Get a byte from the serial bus.
Call address: \$FFA5
Output parameter: A
Machines: All

Whenever you wish to get data from the serial bus this is the routine to use. This routine gets a byte of data and places it in the A register. Before using this routine the TALK routine must be used to tell the device on the serial bus to send data. If the input device requires a secondary command you must send this with the TSKA routine before using this one.

BOOTCALL

Purpose: Boot the disk
Call address: \$FF53
Input parameter: X
Machine: C128

When called this routine will boot any auto start disk that is in the drive. The X register should contain the device number of the drive.

C64 MODE

Purpose: Enable the C64 mode

Call address: \$FF4D
Machine: C128

A call to this routine causes a C128 in C128 mode to switch into C64 mode.

CHKIN

Purpose: Open a channel for input
Call address: \$FFC6
Input parameter: X
Machines: All

This defines a logical file for input. The file must have already been opened by using the OPEN Kernal routine. If you are wanting to receive data from somewhere other than the keyboard this routine must be called before using CHRIN or the GETIN routines. Should you be using the keyboard then the calls to this and the OPEN routine are not required.

CHKOUT

Purpose: Open a channel for output
Call address: \$FFC9
Input parameter: X

Similar to the above routine, however, this time the OPEN file is set up for output. This routine is used before outputting data to any device, unless it is the screen.

CHRIN

Purpose: Get a character from the input channel.
Call address: \$FFCF
Output parameter: A
Machines: All

This routine gets a byte of data from a channel already set up as the input routine by using the routine CHKIN. If CHKIN has not been used then all input is expected from the keyboard. The data is returned in the accumulator.

CHROUT

Purpose: Output a character
Call address: \$FFD2
Input parameter: A
Machines: C16, Plus/4, C64, C128

This routine sends the character in the A register to the current output device. The output device must have been set up using the OPEN and CHKOUT routines. If these have not been used the data is sent top the screen.

CIOUT

Purpose: Send byte over serial bus
Call address: \$FFA8
Input parameter: A
Machines: All

This is the routine used to send data over the serial bus. Before you use this routine the LISTEN routine must be used to tell a device to get ready to receive data. Should the device use a secondary address then you should use the SECOND routine to send this.

CINT

Purpose: Initialize video controller and screen editor
Call program: \$FF81
Machines: All

This routine initialises the video chips and the Screen editor. On the C128 the function keys are set to their default values and the 40/80 key is checked to see which mode the video chip should be in.

CLALL

Purpose: Close all files
Call address: \$FFE7
Machines: All

A call to this routine will close all open files. A CLRCHN routine is also executed to reset all I/O channels.

CLOSE

Purpose: Close a specified file
Call address: \$FFC3
Input parameter: A
Machines: All

This routine is used to close a file after it is finished with. The accumulator should be loaded with the number-of the channel to be closed before calling this routine.

CLRCHN

Purpose: Clear I/O channels
Call address: \$FFCC
Machines: All

Call this routine to clear all open channels and restore the Input/Output channels to their original default values. If any open channels are set up as serial then an UNTALK is sent first to clear the input channel or an UNLISTEN is sent to clear the output channel.

GETCONF

Purpose: Get the configuration byte.
Call address: \$FF6B

Input parameter: X
Output parameter: A

A table at memory location \$FF6B is required for normal operation of the C128. The configuration index should be passed in the X register. The configuration is returned in the A register.

DLCHR

Purpose: Copy the character ROM
Call address: \$FF62
Machine: C128

A call to this routine causes the character set to be copied into the video display chips internal memory.

DMACALL

Purpose: Initialise external RAM components
Call address: \$FF50
Input parameter: X
Machine: C128

When you require direct memory access to external memory it must first be initialised with this routine. The X register should contain the new configuration.

GETIN

Purpose: Get a character
Call address: \$FFE4
Output: A
Machines: All

If the input channel is the keyboard then one character is read from the keyboard queue and its ASCII value placed in the A register. No characters in the buffer places a zero in the A reg. If the input channel is serial, cassette or screen then use the CHRIN routine.

INDCMP

Purpose: Compare the accumulator with memory in any bank
Call address: \$FF7A
Input parameters: A, X, Y \$02C8
Output parameters: \$05

To compare the contents of the accumulator with the contents of a memory location in any bank you should put the configuration index in the X register and the offset in the Y register. Location \$02C8 should hold the address of the zero page memory location that holds a pointer to the memory location that you wish to compare with.

INDFET

Purpose: Get a byte from any bank
Call address: \$FF74
Input parameters: A, X, Y
Output parameter: A

This allows you to read the contents of an address in any configuration without having to change the actual memory configuration. A pointer must be defined in a zero page

location that points to the address to be read. The A register should contain this address. The configuration index is passed in the X register and the offset to the zero page pointer in the Y register. The result is returned in the A reg.

INDSTA

Purpose: Store accumulator in any bank
Call address: \$FF77
Input parameters: A, X, Y, \$02B9
Machine: C128

This routine will store the contents of the A register in any memory configuration. The A register should contain the character to be stored. The zero page address where a pointer to the memory address is stored must be placed in number and the Y register the offset from the location that is in zero page.

IOBASE

Purpose: Define I/O memory page
Call address: \$FFF3
Output parameters: X, Y
Machines: All

This routine sets the X and Y registers to the address of the memory section where the memory mapped I/O devices reside. You can then use this address with relative addressing to access the different ports in the necessary devices. The X register contains the low byte of the address and the Y register the high byte.

This routine provides a certain amount of compatibility between Commodore machines. If you call this routine and use relative addressing to address the registers in the I/O chips.

IOINIT

Purpose: Initialise I/O devices
Call address: \$FF84
Machines: All

This routine initialises all input/output devices and routines.

JMPFAR

Purpose: Jump to any bank
Call address: \$FF71
Input parameters: zero page 2 to 9
Machine: C128

This routine enables a jump to another routine in any bank. Parameters are passed through memory locations 2 to 9.

JSRFAR

Purpose: Jump to a subroutine in any bank
Call address: \$FF6E
Input parameters: Zero page 2 to 9
Output parameters: Zero page 2 to 9

This routine is used to jump to a subroutine in any bank. The parameters are passed in memory locations 2 to 9.

LISTEN

Purpose: Tell a device on the serial bus to listen
Call address: \$FFB1
Input: A
Machines: All

This routine commands a device on the serial bus to get ready to receive data. The A register should be loaded with the device number before using this routine.

LKUPLA

Purpose: Search in table for logical file number
Call address: \$FF59
Input parameter: A
Machine: C128

This routine searches in the table for the device and secondary address of the logical file specified in the A register. If the file is found then carry is cleared, A register contains the file number, X holds the device number and Y holds the secondary address.

LKUPSA

Purpose: Search for secondary address
Call Address: \$FF5C
Input parameters: Y
Machine: C128

The specified secondary address (in the A reg) is searched for in the table of OPEN files. If the search success the carry is cleared and the A register will contain the File Number and the X register the device number.

LOAD

Purpose: Load from device
Call address: \$FFD5
Input: A, X, Y
Machines: All

This routine LOADs data from the specified device. The Accumulator should be set to a zero if a LOAD is to take place or a one should you require a verify. If you OPEN the file with a secondary address of 0 the X and Y registers should contain the start address for the LOAD. If the secondary address is 1 then the data is LOADED into the area of memory that it was SAVED from.

Before you use this routine you must have called the SETLFS and SETNAM routines.

MEMBOT

Purpose: Set bottom of memory
Call address: \$FF9C
Input parameters: X, Y
Output parameters: X, Y
Machines: All

This is used to set the bottom of memory. The lower boundary of the available memory is set with the two registers X and Y. X is the low byte of the address and Y the high. If the carry flag is set when a call is made to this routine the memory bottom is read and returned in the X and Y registers.

MEMTOP

Purpose: Set the TOP of RAM
Call address: \$FF99
Input parameters: X, Y (carry clear)
Output parameters: X, Y (carry set)
Machines: All

When the carry is set the top of memory address is returned in the X and Y registers. If carry is clear the top of memory is set to the address in the X and Y registers, X is the low byte and Y the low.

OPEN

Purpose: Open a logical file
Call address: \$FFCO
Machines: All

This is the routine used to OPEN a logical file. Once the file is set up you can then use it for either input or output. The SETLFS and SETNAM routines must be called before using OPEN.

PFKEY

Purpose: Define a function key
Call address: \$FF65
Input parameters: A, X, Y
Machine: C128

This is the routine to use if you are wanting to define a function key. The zero page address that points to the text for the key should be placed in the A register. The X programmed and the Y register should contain the length of the string.

PLOT

Purpose: Set cursor location
Call address: \$FFFO
Input parameters: X, Y (carry clear)
Output parameters: X, Y (carry set)
Machines: All

A call to this routine with the carry set will return the position of the cursor on the screen in the X and Y registers. X holds the row number and Y holds the column. Calling this routine with the carry clear will move the cursor to the screen position specified in the X and Y registers.

PRIMM

Purpose: Print out a message
Call address: \$FF7D
Machine: C128

All characters following this call are sent to the current output device until a zero byte is reached. The program then continues normally.

RAMTAS

Purpose: Perform RAM test
Call address: \$FF87
Machines: All

This is the initialisation routine that sets up the zero page etc. of the machine. This is sometimes called a warm start.

RDTIM

Purpose: Read system clock
Call address: \$FFDE
Output parameters: A, X, Y
Machines: All

This is used to read the system clock. Three bytes are returned by the routine. The A register contains the most significant byte, The X register contains the next most significant and the Y register the least significant.

READST

Purpose: Read Status word
Call address: \$FFB7
Output parameter: A
Machines: All

This routine returns the status of the I/O devices in the A register. This routine should be called and the status checked after the I/O operation.

RESTOR

Purpose: Initialise the system vectors
Call address: \$FF8A
Machines: All

This routine sets up the default values for all of the computer's system and interrupt vectors.

SAVE

Purpose: SAVE memory to a device
Call address: \$FFD8
Input registers: A, X, Y
Machines: All

This is the routine to use if you wish to SAVE a section of memory. The device address, file name etc. must be set with the SETLFS and SETNAM routines. 128 owners must also set the bank with a call to SETBNK.

The zero page address at which the start address of the area to be SAVED is stored must be placed in the A register. The end address of the area is placed in the X (low) and Y (high) registers.

SCNKEY

Purpose: Scan the keyboard

Call address: \$FF9F
Machines: All

This routine scans the keyboard and checks for a keypress. This routine is called by the interrupt handler. If a key is pressed its ASCII value is placed in the keyboard queue.

SCREEN

Purpose: Return screen format.
Call address: \$FFED
Machines: All (but see 128)
Output parameters: X, Y

This routine returns the format of the screen. On a C64 this would be 40 columns in the X register and 25 lines in the Y register. This routine can be used to determine what machine your program is working on.

128 owners should note that this routine will get the size of the current screen window. After the call the A register contains the maximum column number. The number of lines in the Y register and the X register contains the number of columns.

SECOND

Purpose: Send secondary address for LISTEN
Call address: \$FF93
Input parameters: A
Machines: All

Use this routine when you wish to send a secondary address to an I/O device after issuing a LISTEN command. When sending a secondary address down the serial bus the address must first be ORed with \$60.

SETBNK

Purpose: Define memory bank for disk operation.
Call address: \$FF68
Input parameters: A, Y
Machine: C128

You should call this routine before performing a LOAD, SAVE, VERIFY and OPEN command. The configuration index of the filename should be placed in the Y register and the configuration index of the memory area to be processed should be in the accumulator.

SETLFS

Purpose: Set up a logical file
Call address: \$FFBA
Input parameters: A, X, Y
Machines: All

Use this routine to set the logical file number, device address and secondary address. The file number is passed in the A register. The X register should contain the device number and the Y register the secondary address.

SETMSG

Purpose: Enable/Disable system messages
Call address: \$FF90
Input parameter: A
Machines: All

This routine controls the printing of error and system messages. If bit 7 of the A register is set then error messages will be printed. If bit 6 of the A register is set then system messages will be printed.

SETNAM

Purpose: Set up file name
Call address: \$FFBD
Input parameters: A, X, Y
Machines: All

This is the routine to use when you are setting up a file name for the OPEN, SAVE or LOAD kernal routines. The A register should contain the length of the file name. The X and Y registers should contain the address in memory where the name is stored. X is the low byte and Y the high. 128 owners must also use the SETBNK routine to specify the bank to be used.

SETTIM

Purpose: Set the system clock
Call address: \$FFDB
Input parameters: A, X, Y
Machines: All

The internal 'jiffy' clock can be set by this routine. Before calling this routine the A register should contain the most significant byte, the X register should contain the next most significant and the Y the least.

SETMO

Purpose: Set the time out flag for the IEEE
Call address: \$FFA2
Input parameter: A
Machines: All

This routine saves the value passed in the accumulator as the timeout flag for the IEEE routines. Bit 7 of the accumulator should be set to 1 for timeouts to be effective.

STOP

Purpose: Check if the STOP key is pressed
Call address: \$FFE1
Output parameter: Zero flag
Machines: All

This routine checks to see if the STOP key has been pressed since the last IRQ call. If it has then the zero flag will be set. In addition the CLRCH routine will be called.

SWAPPER

Purpose: Switch between 40 and 80 columns
Call address: \$FF5F
Machine: C128

A call to this routine will cause a toggle between 40 and 80 column modes of operation.

TALK

Purpose: Tell a device on the serial bus to talk
Call address: \$FFB4
Input parameter: A
Machines: All

When you want a device on the serial bus to TALK you must call this routine with the device number in the A register.

TKSA

Purpose: Send a secondary to a device that is commanded to TALK
Call address: \$FF96
Input parameter: A
Machines: All

This routine will transmit the secondary address contained in the A register to a TALK device.

UDTIM

Purpose: Update the system clock
Call address: \$FFFA
Machines: All

This routine causes the system clock to be updated. It is normally updated by the interrupt every 1/60th of a second.

UNLSN

Purpose: Send an UNLISTEN command
Call address: \$FFAE
Machines: All

A call to this routine will tell all devices on the serial bus that are listening to stop receiving data.

UNTLK

Purpose: Send an UNTALK command
Call address: \$FFAB
Machines: All

A call to this routine will tell any devices that are set to TALK to stop transmitting data.

VECTOR

Purpose: Copy or reset the system vectors
Call address: \$FF8D
Input parameters: X, Y (carry clear)
Output parameters: X, Y (carry set)

Machines: All

Calling this routine with the carry bit set stores the current contents of the RAM vectors in a list pointed to by the X and Y registers. Calling this routine with the carry bit clear causes the RAM vectors to be copied from the area pointed to by the X and Y registers.

In Bare Facts we are attempting to provide you with the necessary information to make writing machine code programs and transferring machine code program from one machine to another. If there are any specific areas that you would like us to consider for inclusion in this section of the magazine then please write to us at:

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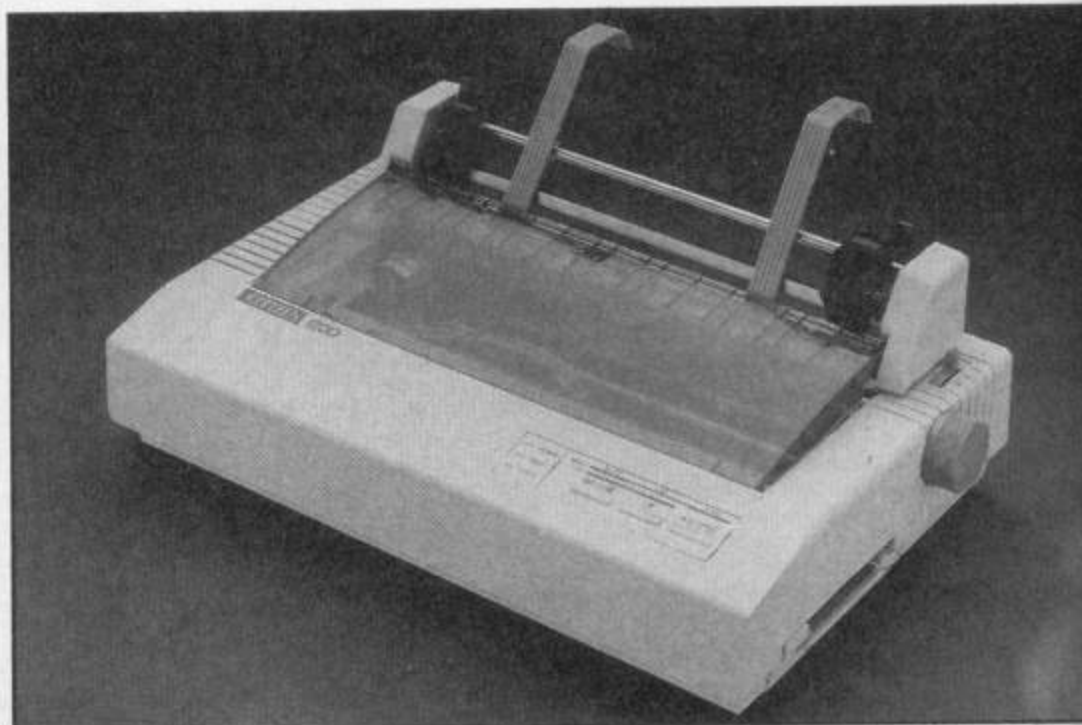
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Printer Winner

The winner of our December competition was Graeme Gibson, from Pity Me in Durham. He has won a Citizen 120D Dot Matrix Printer worth £197 excluding VAT. A Commodore printer interface is also being included so that the printer is ready for immediate use. Congratulations Graeme!

Congratulations!

The first prize winner of the CRL Nu-Wave competition was Brian Osborn of Kirkintilloch who receives a superb package of a signed Tubular Bells album, a copy of the video and the computer program. The 29 runners up prizes of the program go to: D.J. Arnett, Swindon; Henry Topham, Silsden Keighley; W.H. Cox, West Lynn; Stephen Smith, Burnham; Mr F.G. Bullimore, Paignton; Ann Palmer, Stalham; C.M. England, Cheadle Hume; Tracy Roche, Poole; Mr R. Lucia, Harlow; Mark Winfield, Normal Hill; Julian Fagandini, Dulwich; J. Harper, Belfleet; Mr R. Gillings, Portsmouth; Andrew Fairbrother, Frinton-on-Sea; Ian Hallam, Havant; Peter Ovenden, Somerset; H.J. Bleumink, The Netherlands; D. Derrick, Cheddar; Ian Horn, Colchester; Mr J. Gubbins, Aldershot; Mr D. Taylor, Isle Of Wight; Maureen James, Durham; Michael Treacy, Co. Limerick; P.A. Hardy, Farnborough; Stephen Holliday, Chorley; Anthony Grist, Hove; Steve Skinner, Nottingham; Simon Thurman, Birmingham.



Oops!

In our February issue, there were some confusing line numbers in the *Word Pro Add On* article for the Plus/4. There was an assembly listing omitted from the article and although this is not necessary, when you want to type in and run the program, it may be quite useful to those of you who are interested in exactly how the program works. Therefore, if you want a copy of the listing, please send an s.a.e. to Word Pro Listing, *Your Commodore*, 1 Golden Square, London W1R 3AB.

Also in the February issue there is a stray characters in two lines of Adventure Aid Graphics (p.90). The line should actually read:

```
360 IF IS="" THEN C3=C3+1: SYS SA
+6, C1, C2, C3: GOTO 130
420 PRINT TAB(26) "LUSONJ4CRUSOFF
J : [YELLOW, SPOUND, WHITE]"
```

We apologise for any inconvenience which these slight errors may have caused to our readers.

Hex Data Entry

We have had a number of calls from people who are having problems getting the [REV H] and [REV SN] in line 30. These should appear in the listing as a reverse H character and a reverse shifted N. In the LISTINGS article we explain how to get a [REVT] character, follow the same procedure for these. It appears that a dot has disappeared in some copies of the magazine. Line 540 should have [LEFT3]. [LEFT2] within the quotes.

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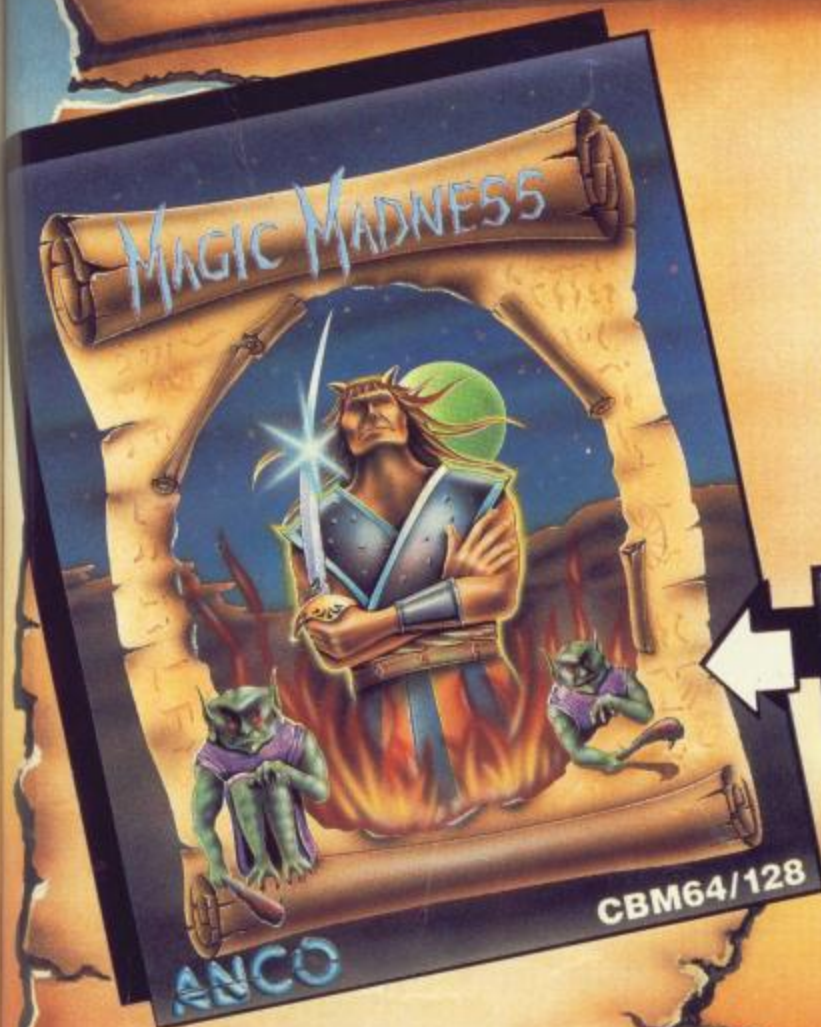
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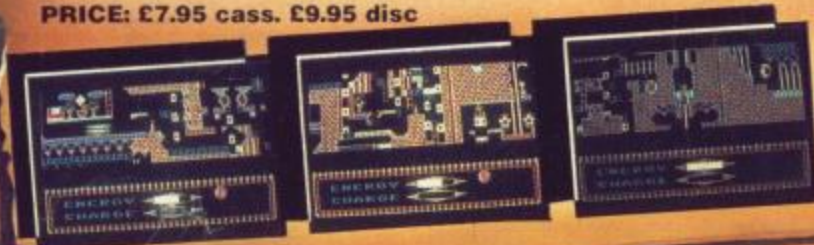
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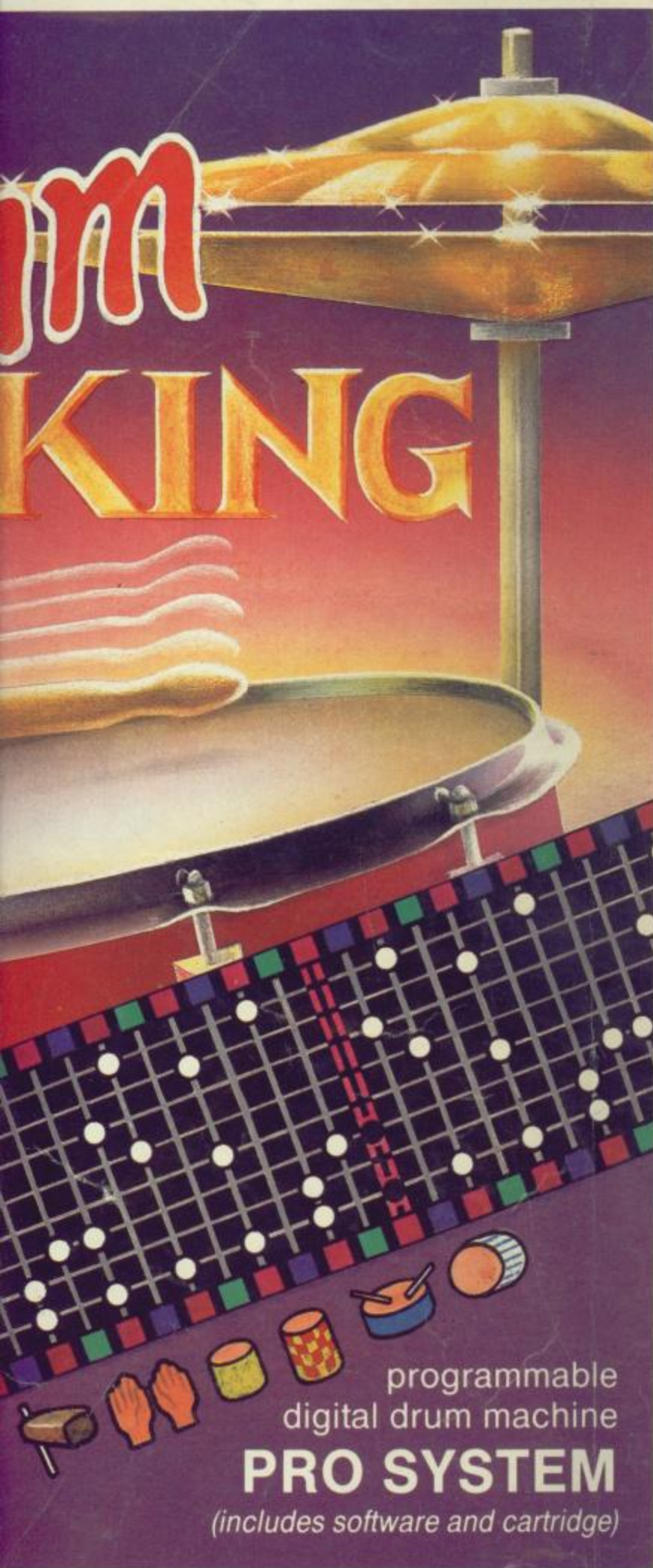
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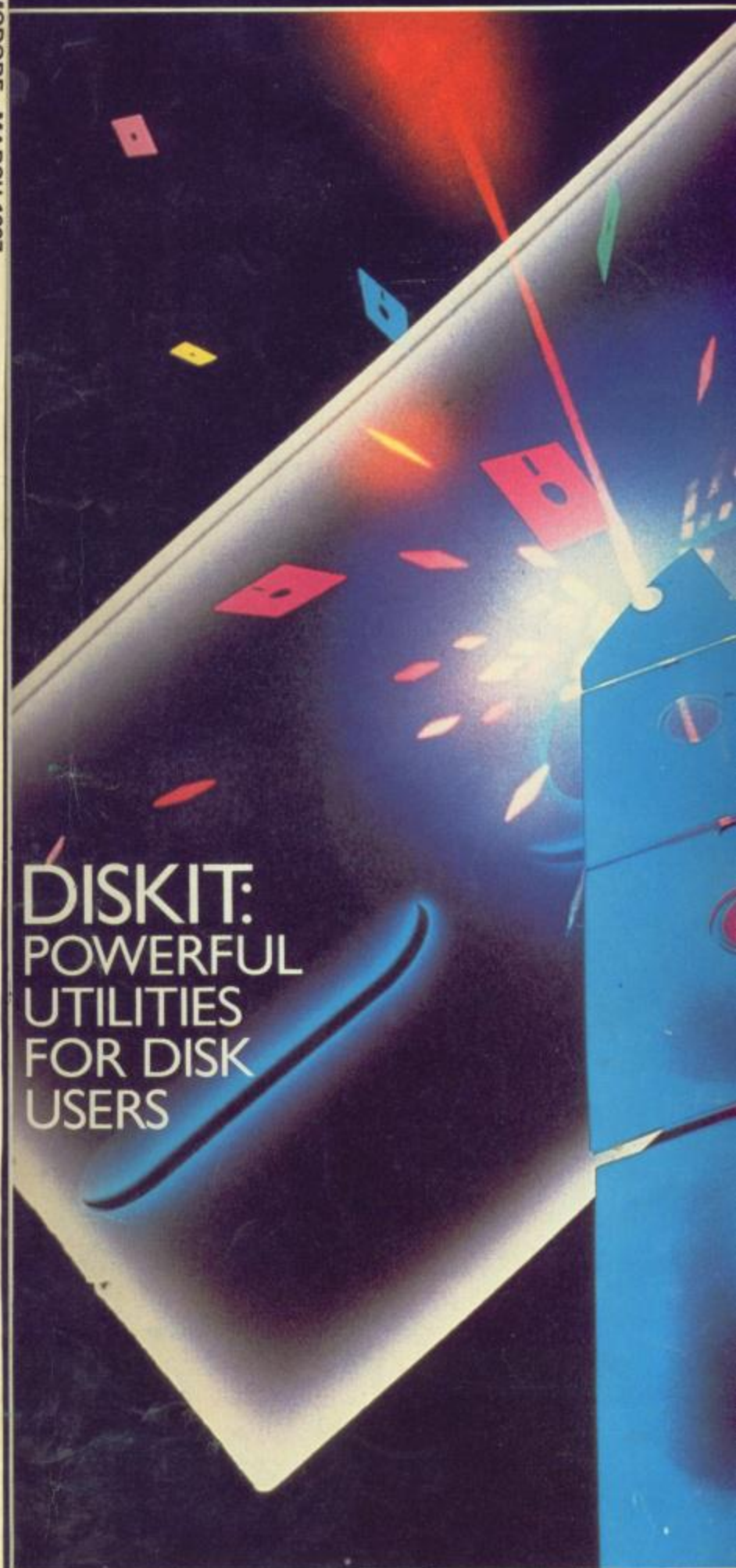
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